RHAON

Connect Control Supervise

USERS MANUAL

Installation & Operating Instructions
RHAON Version 1.2.2.14

For All Renkus-Heinz **RHAON-Empowered** Loudspeaker Systems

Users of Renkus-Heinz Iconyx **IC-R** or **IC Live** digitally steered line arrays should refer to the Owners Manual supplied with these arrays for detailed instructions on their setup and use.

RENKUS-HEINZ

IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions
5. Do not use this apparatus near water. The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on it.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Make sure the power cord remains readily accessible at all times.
12. The AC Power Cord is the AC Mains disconnect.
13. Only use attachments/accessories specified by the manufacturer.
14. Disconnect this apparatus during lightning storms or when unused for long periods of time.
15. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

"WARNING - TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE"

"CAUTION: THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED SERVICE PERSONNEL ONLY. TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO".

Explanation of Graphical Symbols

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the use to the presence of uninsulated "Dangerous Voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to humans.

The exclamanation point, within an equilateral presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

Erklärung der graphischen Symbole

Der Blitz mit nach untenzielendem Pfeil in einem gleichseitigen Dreieck weist den Benutzer auf das Vorhandensein einer unisolierten, "gefährlichen Spannung" im Gehäuse hin, die stark genug sein kann, einer Person einen gefährlichen elektrischen Schlag zu versetzen.

Das Ausrufezeichen in einem gleichseitigen Dreieck weist den Benutzer auf wichtige Betriebs- und Wartungsvorschriften in den beiliegenden Unterlagen des Gerätes hin.

CAUTION

RISK OF ELECTRONIC SHOCK: OPEN ONLY IF QUALIFIED AS SERVICE PERSONNEL

To reiterate the above warnings: servicing instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than that contained in the Operation Instructions unless you are qualified to do so. Refer all servicing to qualified personnel.

VORSICHT

GEFAHR EINES ELEKTRISCHEN SCHLAGES: NUR VON QUALIFIZIEREM WARTUNGSPERSONAL ZU ÖFFNEN

Eindrigliche Warnung: Wartungsvorschriften dienen nur der Benutzung durch qualifizieres Personal. Zur Vermeidung eines elektrischen Schlages keine anderen als die in den Betriebsvorschriften beschriebenen Wartungsarbeiten ausführen, es sei denn Sie sind dafür qualifiziert. Wartungsarbeiten auszuführen.

IMPORTANT

Your Iconyx Steerable Column Loudspeaker contains no user-serviceable parts and all service should be referred to qualified service personnel.

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SHIPPING INSPECTION

Congratulations on your purchase of a Renkus-Heinz RHAON Empowered loudspeaker system. We hope you enjoy it.

Your RHAON empowered loudspeaker was carefully tested and inspected before leaving our factory and should have arrived in perfect condition.

Please carefully inspect the shipping carton(s) and loudspeaker(s) for any noticeable damage, and if any damage is found, immediately notify the shipping company. Only you, the consignee, may institute a claim with the carrier for any damage incurred during shipping.

Be sure to save the carton(s) and all packing material for the carrier's inspection. It is also a good idea to save the carton and packing material even though the loudspeaker arrived in good condition. If you should ever need to ship the loudspeaker, it should be shipped in its original factory packaging.

TECHNICAL SUPPORT

If you have any questions about RHAON-Empowered Loudspeakers or encounter a problem designing, installing, setting up or operating a RHAON system, please call our technical support staff at 949-588-9997 and ask the operator for technical support on RHAON. Call Monday through Friday from 8:00 AM to 5:00 PM Pacific Time.

The latest information on RHAON Technical Support is always available online at http://www.renkus-heinz.com/support/software-support/rhaon/e-mail.html. You will also find a support request form at http://www.renkus-heinz.com/support/request-info/tech-info/index.html.

IMPORTANT

This manual was written for use with all Renkus-Heinz 2-way and 3-way self-powered loudspeakers and self-powered subwoofers. Users of Renkus-Heinz ICONYX or IC Live digitally steered line arrays should refer to the Owners Manual supplied with these arrays for detailed instructions on their setup and use.

Several functions are described in this manual which might not yet be supported by the RHAON software version you are using. In many cases those missing features are not essential, but if they are for you, please check our website for available software updates. Go to www.renkus-heinz.com and click on the RHAON button on the left side of the Home page. You'll see the link to the latest program version at the top of the page. For more detailed information on keeping your RHAON program up-to-date, refer to pages 36 - 38 in this manual.

In case our updates do not correct your problem and a missing feature is important to your installation, please contact our Technical Support group by phone or e-mail.

INTRODUCTION TO RHAON

Your digitally controlled RHAON empowered loudspeaker system.

RHAON

RHAON (“rayon”), the Renkus-Heinz Audio Operations Network, is the first practical system to combine digital audio distribution with precise control and supervision of self-powered loudspeakers. RHAON uses standard Ethernet hardware, advanced CobraNet technology and on-board DSP (digital signal processing) to turn self-powered Renkus-Heinz loudspeakers from “black boxes” into “smart boxes” that can respond to user input in real time.

Multi-dimensional RHAON technology lets you:

- Connect multiple loudspeakers with multiple channels of high quality digital audio via CobraNet; identify CobraNet devices and link them using an intuitive point-and-click interface.
- Control every RHAON-Empowered loudspeaker on the network, including Iconyx and IC Live steerable arrays and their beams. A computer running Windows-based RHAON software gives you password-protected access to the powerful DSP inside each RHAON hardware module.
- Supervise the entire system’s operation and performance over the network using RHAON software. Supervise mode includes logging and operator alert functions.

You can use all three RHAON modes, or any combination of them. For instance, each RHAON hardware module has dual analog inputs and a serial digital audio input (often called an AES/EBU input) along with redundant Ethernet connections.

Important Information

Your RHAON-Empowered Loudspeaker’s amplifier stores all onboard DSP settings, including the input source selection, in non-volatile memory. Analog Input 1 has been pre-selected at the factory so you can use the loudspeaker as an ordinary self-powered loudspeaker. Just connect a line level audio signal to Analog Input 1, connect the AC power and turn the loudspeaker on. This input is always available for testing the loudspeaker and amplifier, regardless of the programmed input settings.

You will need a computer with a NIC (Network Interface Card) and Windows-based RHAON software to change the input selection or any of the other DSP settings. Once your DSP settings are stored in non-volatile memory, the computer can be disconnected from the network. You will need to connect a computer only when you want to change the settings or when you want to use the supervise feature.

Renkus-Heinz engineering has programmed the onboard DSP to optimize the loudspeaker’s performance and to ensure its safe operation. Replace the RHAON hardware module only with another unit that has been factory programmed for the same loudspeaker. Contact our Technical Support Department for details and assistance.

Access Control Note

RHAON systems feature several levels of password-protected access control to prevent inadvertent or unauthorized changes of the control settings. Even when you connect a computer running RHAON software, you may be denied access to some or all of the Connect and Control mode functions, depending on how the access control system is configured. For further information on password protection refer to page 40 of this manual or contact the person responsible for the setup and tuning or commissioning of your system.

RHAON ORGANIZATION: Three Fundamental Audio Operations

Before we go on, let's take a look at the structure of RHAON. Audio operations comprise three fundamental areas that are necessary for the success of any sound system:

CONNECT

In a RHAON system there are both physical connections and network (software) connections. The physical connections are made using UTP cable meeting at least CAT5e standards and/or analog cables as well as AC power cords. Network connections are established in the software. You don't have to make the two types in a particular order. RHAON software allows you to set up a "virtual system" using beam steering, pre-configure DSP settings for individual loudspeakers and establish and store preset configurations before the physical connections are made. If you are using RHAON's CobraNet digital audio functions, you will also need to connect a CobraNet source (an analog to CobraNet converter) to the network.

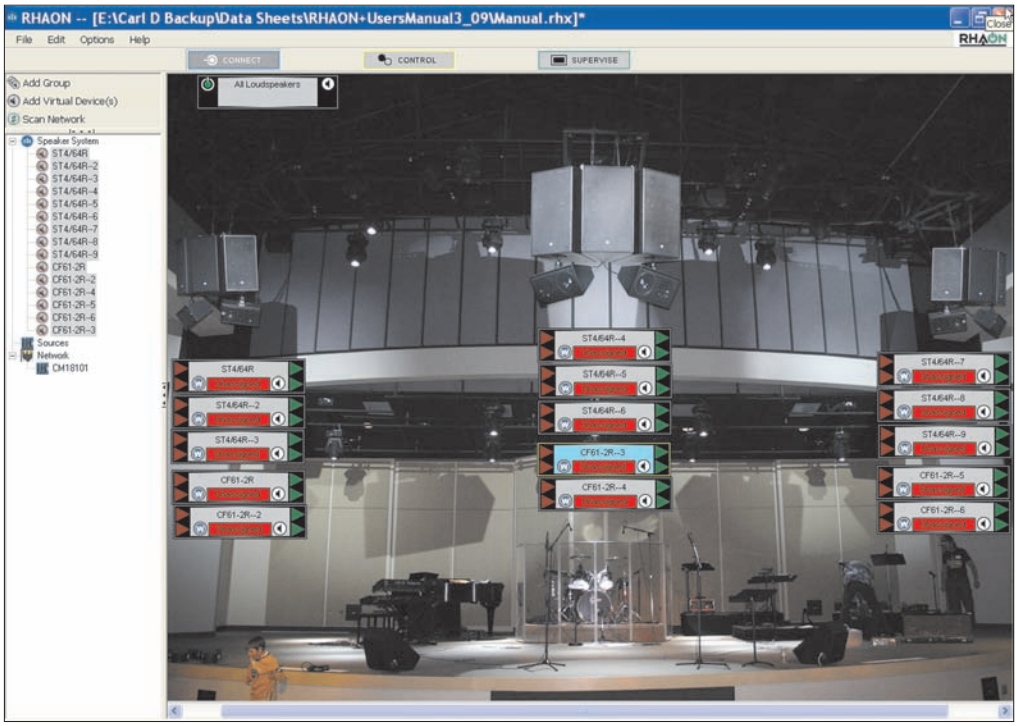
CONTROL

You can control many DSP parameters in realtime, and/or pre-configure them in software prior to installation and make final adjustments during commissioning or setup.

SUPERVISE

RHAON allows both real-time supervision while the system is in use, and remote supervision with fault logging and operator alerts via e-mail, text messaging, etc.

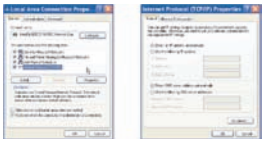
At any time you can switch into any of the three RHAON modes using the Connect | Control | Supervise tool bar directly above the work space. You can also switch between the three modes using tabs inside the Loudspeaker Properties windows.



RHAON TYPICAL PROJECT WORKFLOW

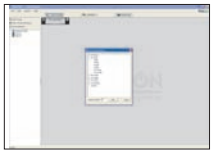
PREPARATION

INSTALL RHAON
software under
Windows 2000,
Windows XP



SET STATIC IP ADDRESS TO 192.168.1.1
(or a different value if you need to).
192.168.xxx.xxx are local IP addresses
that won't appear on the Web.

CHOOSE BACKGROUND IMAGE
This can make it easier to see
where Groups and Loudspeakers
are in the venue



ADD VIRTUAL SPEAKERS
or scan network for actual
loudspeakers

GROUP VIRTUAL SPEAKERS
or group actual loudspeakers
found on your network

CONNECT

CABLING
Ethernet
Serial Digital
Analog
AC Power

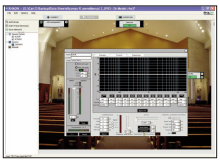
SCAN THE NETWORK
RHAON assigns
IP Addresses as needed

ASSOCIATE VIRTUAL &
ACTUAL LOUDSPEAKERS
Drag from left panel,
drop on icon in right panel

ROUTE COBRANET
CobraNet Source
Drag-and-Drop Tx/Rx links

SELECT DIGITAL and/or
ANALOG INPUTS

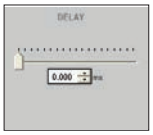
CONTROL



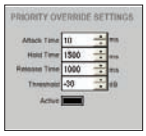
CONTROL PANEL
Configure Loudspeaker
Array

EQUALIZATION
8-band parametric EQ,
hi-and lo-shelving
hi-pass and lo-pass

COMPRESSION
Threshold / Ratio
Attack / Release
Soft Knee / Trigger Point



DELAY
0 to 340 milliseconds @ 48 kHz
0 to 170 milliseconds @ 96 kHz

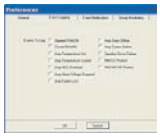


PRIORITY OVERRIDE
Attack / Release
Threshold / Hold
Engage / Disengage

SUPERVISE

OPERATOR ALERTS
RHAON indicates problems
such as over temperature,
clipping or driver failure at
System, Group and
Loudspeaker levels

DETAILED INFORMATION
Just click through to the
loudspeaker's Supervise screen
to identify the nature of the
problem and take corrective
action



FAULT LOGGING
RHAON logs the fault
conditions you specify to a
file on your hard drive

OPERATOR NOTIFICATION
via e-mail or text message
(if your computer has a second
NIC with an Internet
connection)

MULTI-LEVEL PASSWORD
PROTECTION
restrict access to Connect and
Control functions

Software Installation

You need a Windows PC running RHAON software in order to maximize the performance of RHAON-Empowered loudspeakers and your RHAON system. You can use RHAON software during the design stage, for system setup, tuning and commissioning, and for remote control and supervision. You can disconnect the computer from the network after commissioning the system, if you or your client are not using RHAON's system supervision capabilities.

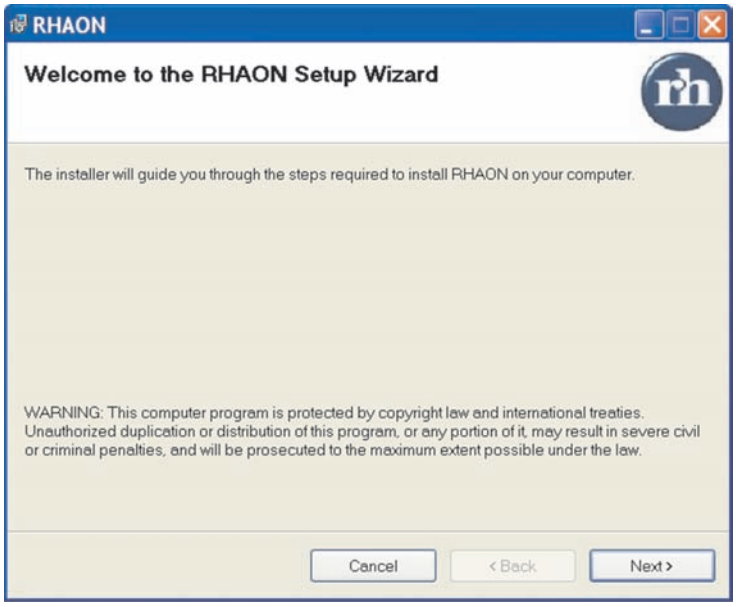
RHAON software will run on any PC computer that meets or exceeds the following requirements.

Processor / Speed:	Pentium / 800 MHz minimum (faster recommended, especially for large systems)
RAM:	256 MB minimum (more recommended, especially for large systems)
Interface:	At least one Network Interface Card (NIC) with a 100 BaseT (100 MB/second) or faster Ethernet Port; two NICs are needed if the computer will also be used to e-mail alerts
Operating System:	Windows XP
Associated Software:	.NET Framework 3.5 or higher (supplied with RHAON installation CD)
Screen Resolution:	1024 x 768 or higher

To install the software insert the RHAON Installation Disk into the computer's CD drive. The installation program should start automatically. If it doesn't, go to your Start menu. Then select Settings/Control Panel & Add/Remove Programs. Click on Install to start the installation manually.

If you have an older version of RHAON installed, a prompt will inform you that you must remove the older version before installing the new version. Use Control Panel & Add/Remove Programs to remove the older version and then restart the Setup program.

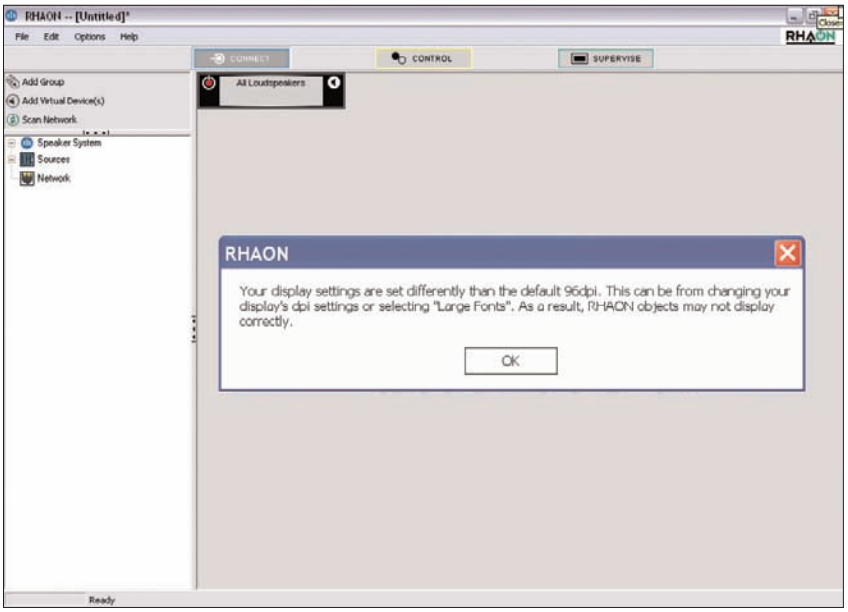
The RHAON Setup window shown below will open.


RHAON
Welcome to the RHAON Setup Wizard
The installer will guide you through the steps required to install RHAON on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

Click on Next to proceed to the next step. Then follow the screen prompts until the installation is complete.

During the installation you will be asked if you want to install the CobraNet Components. Answer "Yes", even if you will not be using CobraNet digital audio distribution. These CobraNet files are needed by RHAON for control and supervision.

The RHAON Installer puts a RHAON Icon on your desktop. Double click on it to open the RHAON software program. You should see the opening screen shown below.



Notice that the program warns you if your display settings may cause viewing problems. If you are using “Large Fonts,” we recommend you change to the default 96 DPI setting to avoid possible viewing problems.

The grey background with RHAON watermark can easily be changed to something more useful, such as a block diagram of your system or a photo of the venue. To change the background, go to the Options pull-down menu and select Background Image/Load Image. Then browse to the drawing or photo you want to use.

Be aware that the photo or drawing you import needs to be of approximately the proper size and shape before importing. If it is slightly to large, scroll bars that allow you to shift the picture up and down and to the right or left will appear. It it’s too small, blank space will surround it.

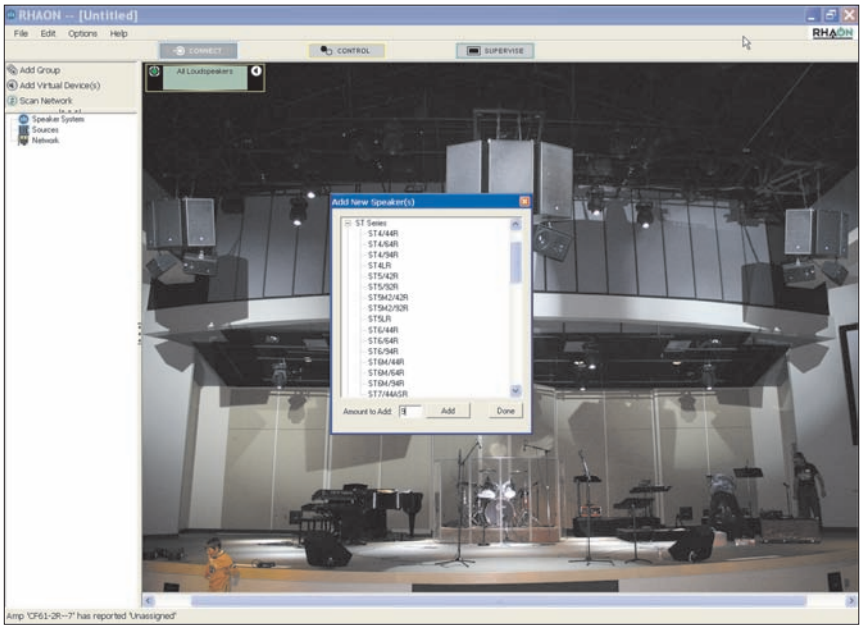
Customizing Your RHAON Workspace

System design is an essential audio operation: RHAON software can save time at the venue by enabling you to set up a complete virtual loudspeaker system before you connect the computer to the network. You can do this anywhere: at the office, on the bus, etc. Once RHAON-Empowered loudspeakers have been physically connected to the network, you connect your computer, link virtual loudspeakers with actual ones, and upload settings to each individual loudspeaker.

Your loudspeaker system can include individual loudspeakers, groups of multiple loudspeakers, or a combination of both. Groups as well as individual loudspeakers can be controlled (turned On or Off, Muted, have their levels adjusted, and more) using your mouse.

We recommend you plan your groups so all the loudspeakers in a group use the same DSP settings. You can always control each individual loudspeaker, but it's usually more efficient to have them grouped together..

You begin designing a virtual system in the main RHAON window, which is divided into two sections. On the left side of the window you will find a list of all the available devices in a directory tree format. If you need more space on the right, minimize the left hand section by clicking on the Close icon on its right edge. The larger section on the right displays loudspeaker icons and other specialized work areas: the All Loudspeakers icon represents your loudspeaker system.



In the screen shot here, we're adding nine ST4/64R loudspeakers to our system. Clicking on Add Virtual Device(s) in the top left toolbar opens an Add New Speakers window. Browse to find the loudspeaker model you want to add (ST4/64R in the example) and select it. Type a quantity (9 in our screen shot) into the Amount To Add field and click the Add button.

In the screen shot to the right, icons representing the nine ST4/64R loudspeakers have been added to the workspace and moved to their approximate location by grabbing them with the Mouse Cursor and moving them.

Our sample system also has six CF61R downfill loudspeakers, so add them to the virtual system using the same technique.

From here you can either assign a static IP address to your computer (the final step in Preparation) and Connect to your loudspeaker network or define initial DSP settings for your virtual loudspeakers. Virtual DSP settings can be uploaded later to the loudspeakers once they have been connected to the network.

Assigning a Static IP Address to the RHAON Host Computer

You can begin your preparation offline in a virtual environment, but to make a RHAON system operational you have to connect your computer and RHAON-Empowered loudspeakers to an Ethernet network.

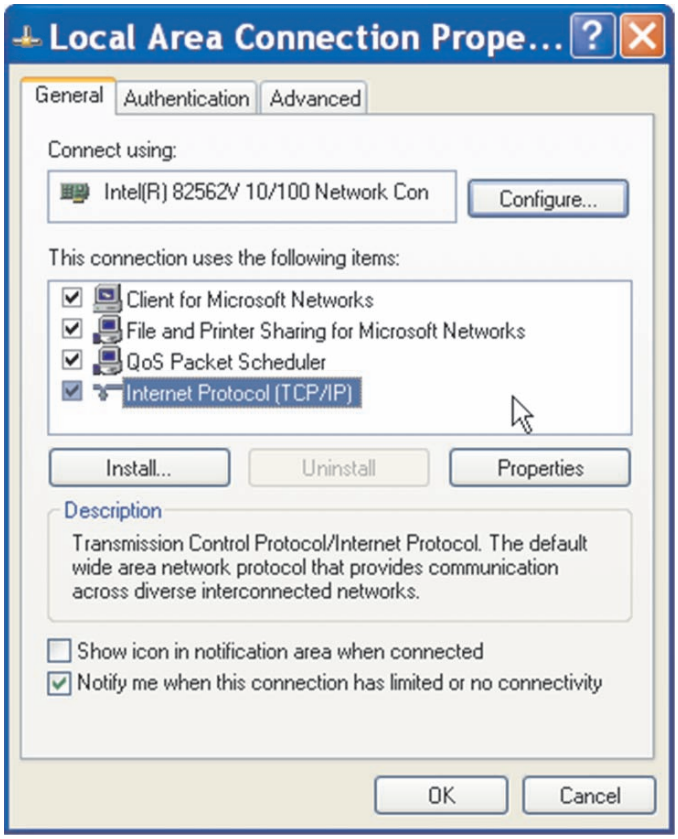
You need to associate the virtual loudspeakers you have created in RHAON with the actual loudspeakers installed in the system. The first step is to make sure the computer's Network Interface Card (NIC) is setup properly. Your computer must have a static IP address assigned: this enables RHAON software to communicate to all the loudspeakers on the network.

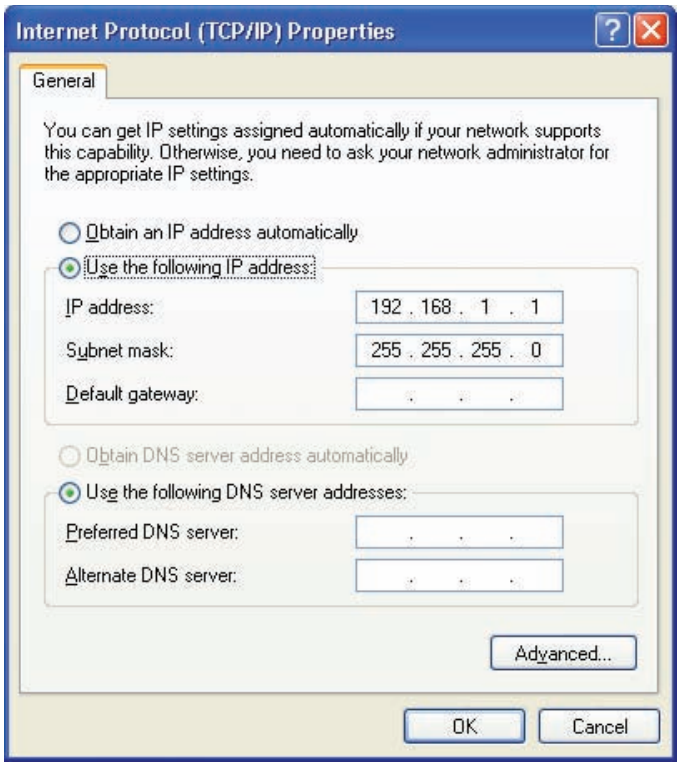
Each device on the RHAON/CobraNet network must have a unique IP address in order to communicate. RHAON software can assign the IP addresses to your networked loudspeakers automatically.

In Windows, go to My Computer/Control Panel/Network Connections. Find the connection you wish to use. It will likely be called "Local Area Connection", unless you have renamed it. Also, note the model of the NIC (Network Interface Card), as the RHAON software will require it later. Right click the icon and click "Properties" to open its Properties window.

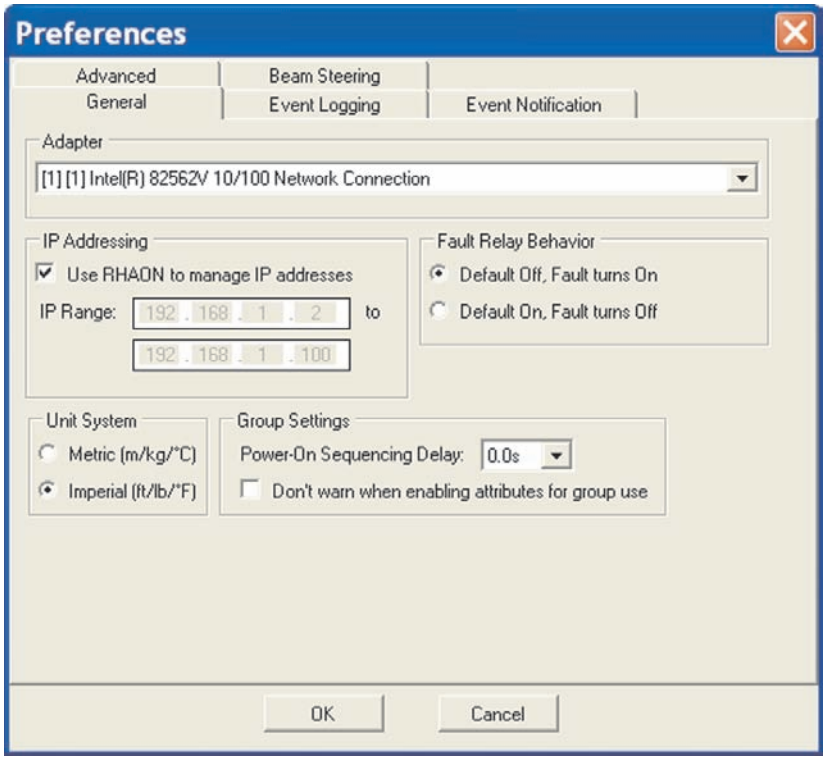
Then, double click on Internet Protocol (TCP/IP) to open its Properties window. You will probably see that your computer is configured to Obtain an IP Address Automatically. Change this to Use the Following IP Address and enter an IP address of, for example 192.168.1.1. Next, insert 255.255.255.0 into the Subnet Mask field. Click OK and you are ready to connect to the RHAON/CobraNet network.

Note: IP addresses are in the format xxx.xxx.xxx.xxx where "xxx" is any digit from 0 - 255. Local IP addresses that appear only to other devices on a LAN (Local Area Network) are defined as ranges 192.168.xxx.xxx, 10.xxx.xxx and 172.16.xxx.xxx to 172.31.xxx.xxx.




Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 1
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Prior to plugging a RJ-45 connector into your computer's Ethernet port, you need to make sure that RHAON has the correct network settings. In the RHAON software, go to the Options menu and select "Preferences". On the General tab, make sure the correct NIC is selected in the Adapter field. The available selections are based on the listing of your network connection you noted earlier. Refer to page 13.



Each device on the RHAON/CobraNet network must have a unique IP address in order to communicate over the Ethernet network. The RHAON software can assign IP addresses to all the RHAON-Empowered loudspeakers connected to your network. Since we want RHAON to manage the IP addresses, make sure the "Use RHAON to Manage IP addresses" feature in the IP Addressing section is checked.

Before RHAON can scan your network and assign IP addresses to the devices it finds, you need to specify a range of IP addresses to use. The static address assigned to the computer in Windows sets the "subnet" you will be using. A subnet is the first three parts ("octets") of the IP address. In the example, the subnet is 192.168.1. Therefore, all the IP addresses on the network will be in the form 192.168.1.xxx.

To define the range of IP addresses RHAON will scan, first uncheck the "Use RHAON to Manage IP addresses" box. Then type two valid IP addresses into the two fields: one for the lower limit of the range and the other for the upper limit. Since 192.168.1.1 is already in use by the RHAON host computer, the lower limit must be at least 192.168.1.2. The upper limit can be as high as 192.168.1.255, but needs to be only high enough to accommodate all the devices on the network. Remember each device must have its own IP number.

After specifying the range of IP addresses that RHAON will assign to the loudspeakers, be sure to check the "Use RHAON to Manage IP addresses" command before leaving this window. Click OK and connect the computer to the RHAON/CobraNet Ethernet network, i.e., plug in the network cable.

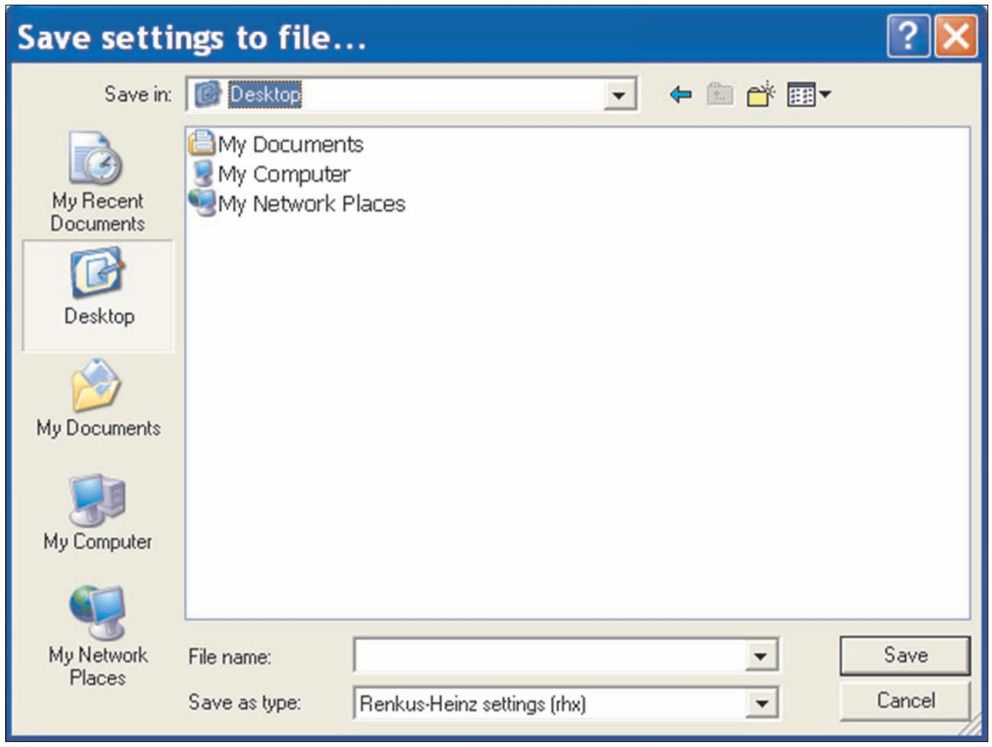
Unless you are pre-configuring a RHAON system offsite and offline by creating Groups and/or defining initial DSP settings for virtual loudspeakers, there is no need to create virtual loudspeakers before connecting your computer to the network. RHAON software can scan the local Ethernet network, identify all connected loudspeakers, assign IP addresses to them, and place icons in your main project workspace.

Saving Your Project

It's always a good idea to save your work regularly when using any computer software. If you have not done so, RHAON will remind you with a prompt if you attempt to close the program without saving.

When you are ready to save your work, select Save from the File pull down menu to open the familiar Windows File Save screen shown below. Name your project, browse to the desired file location and Save the file.

You will also be prompted to Save Your Project before you exit RHAON software.



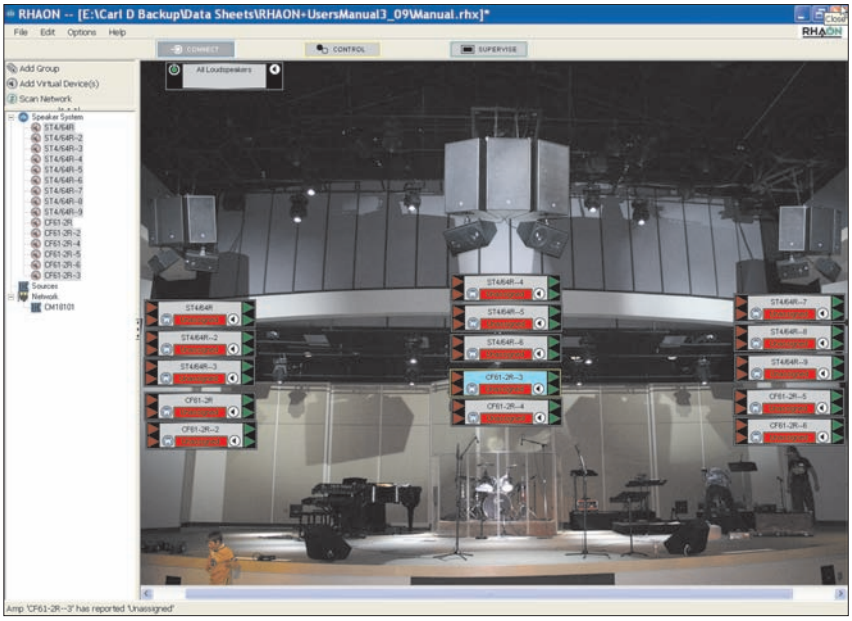
Saving Changes (Auto-Save)

Each loudspeaker's Connect,Control and Supervise Properties window is a blank black bar in the lower left corner. Whenever you make a change in the loudspeaker's settings, the word Save will appear briefly in this space. This is a reminder that the change has been saved to the project file and sent to the loudspeaker's DSP.

Linking Software Icons with Networked Loudspeakers

To connect a RHAON network, you first make all the hardware connections, and then (if you are using CobraNet for digital audio distribution) assign signal routing using RHAON software. Since all Ethernet connections are made using RJ-45 connectors and CAT5e cable, the network infrastructure is cost-effective and easy to install. You can also connect Serial Digital (AES3id aka AES/EBU) and analog audio to a RHAON-Empowered loudspeaker, as well as Fault Detect and Fault Relay lines. A typical amplifier input panel is shown on pages 33 and 34 in Appendix I.

Let's say you've connected all your Ethernet inputs and outputs. Every venue is different: so is every network. For examples of RHAON / CobraNet networks, see Appendix 1.



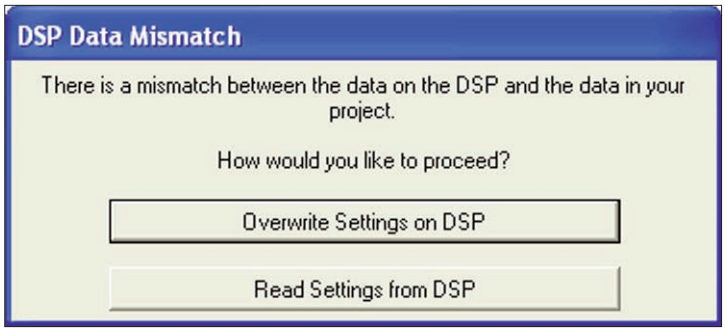
Remember: before connecting your computer running RHAON software to the network, you should have assigned it a static IP address. If you've done that, connect the computer to your RHAON network and click on the Scan Network icon. RHAON software will find all networked loudspeakers and automatically assign them IP addresses .

RHAON will also identify any other CobraNet devices on your network. CobraNet devices, including RHAON-Empowered Renkus-Heinz loudspeakers, will be listed under Network in the directory tree. Note that you did not have to first create virtual loudspeakers. RHAON found the actual loudspeakers.

The next step is to drag each loudspeaker listing into the work space. This will create an icon for it.

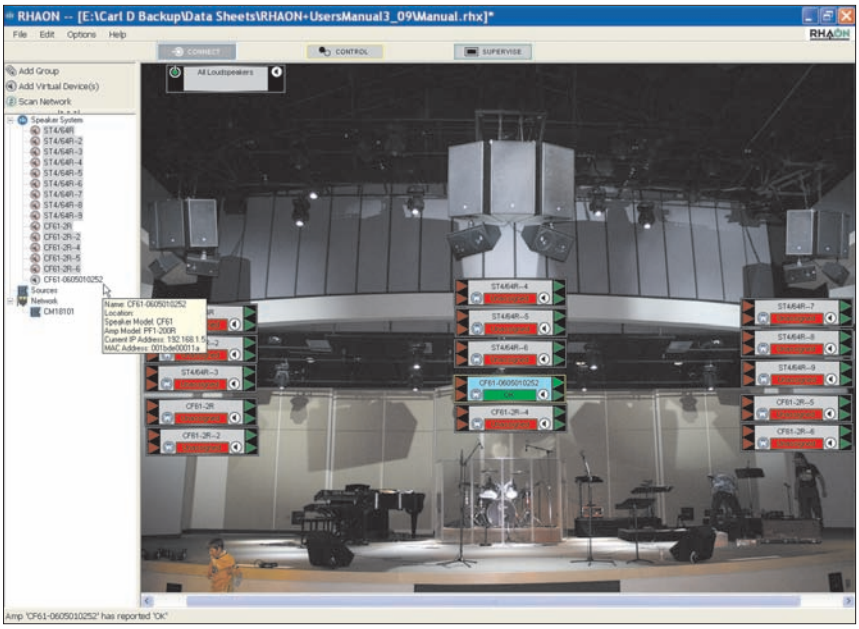
If you created virtual loudspeakers before scanning the network, drag each individual listing from the Network folder into the main work space and drop it on the appropriate icon.

When you link a networked loudspeaker with a software icon, RHAON interrogates the loudspeaker to make sure the DSP settings stored on your computer are synchronized with those in the loudspeaker's onboard memory. If they are not, RHAON displays a prompt that allows you to choose which settings to use. To upload settings from your computer to the loudspeaker, click on Overwrite Settings on DSP. To download settings from the loudspeaker and copy them into computer memory, click on Read Settings from the DSP.

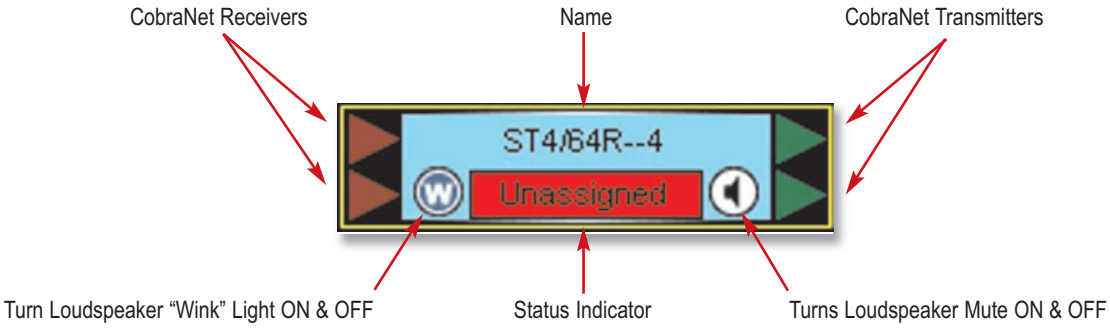

DSP Data Mismatch
There is a mismatch between the data on the DSP and the data in your project.
How would you like to proceed?
Overwrite Settings on DSP
Read Settings from DSP

Continue until all networked loudspeakers are linked to icons in the main workspace. When an icon is linked to a networked loudspeaker, the status indicator under its name changes from Unassigned (Red) to OK (Green).

To confirm that the setup is complete, return to System Layout and place the cursor over the loudspeaker listings in the directory tree. As you can see from the pop up screens, RHAON has assigned IP numbers to each of the loudspeakers.



Let's take a closer look at the Connect Mode loudspeaker icon.



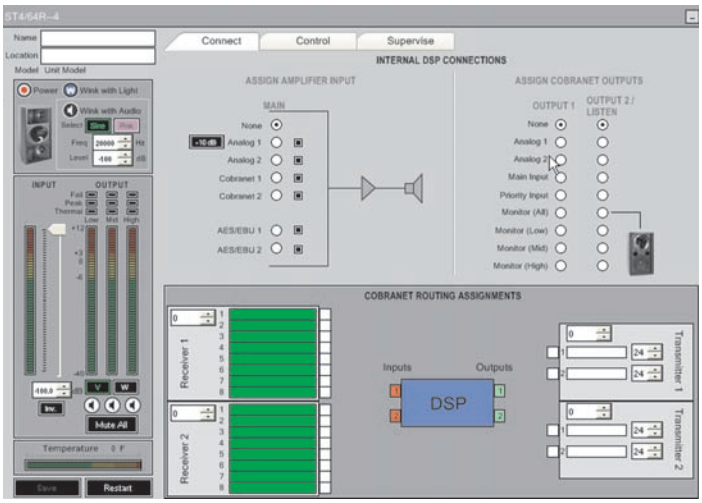
Clockwise from the top, the first item is the icon's name. By default this is the model number of the actual loudspeaker. It can be changed to something more descriptive ("balcony center," for example) in the Connect Properties window. The loudspeaker symbol on the right is a Mute control: click on it to mute or un-mute the loudspeaker.

The green triangles on the far right represent CobraNet Transmitters (Tx). Each CobraNet Transmitter can transmit one channel of information from the DSP out to the CobraNet network. The Status bar at the bottom of the icon indicates that the icon is Unassigned by turning red: it will be green and read OK when this icon has been linked to a networked loudspeaker.

To its left is a "W" button. Click on it to Wink the light on the front of the networked loudspeaker that is linked to the icon. This makes it easy to identify the loudspeaker and confirm its location. On the outside left edge of the icon are two red arrows representing CobraNet Receivers (Rx): each can receive one signal out of a bundle of up to 8 audio channels from the network.

Double clicking on a Connect Icon will open the Connect Properties screen associated with the linked loudspeaker. More details on Properties Screens are on the next page.

The three operational modes of RHAON, Connect, Control and Supervise all have their own unique Properties window (see below). Notice that the vertical pane on the left side of each window is identical except for the number of output bargraphs. Single amplifier loudspeakers, such as the CF61-2R, will have a single meter, bi-amped loudspeakers will have 2 output meters and 3-way loudspeakers will have 3 output meters. The Connect, Control and Supervise tabs at the top of the window allow you to switch between the three operating modes without returning to the main window.

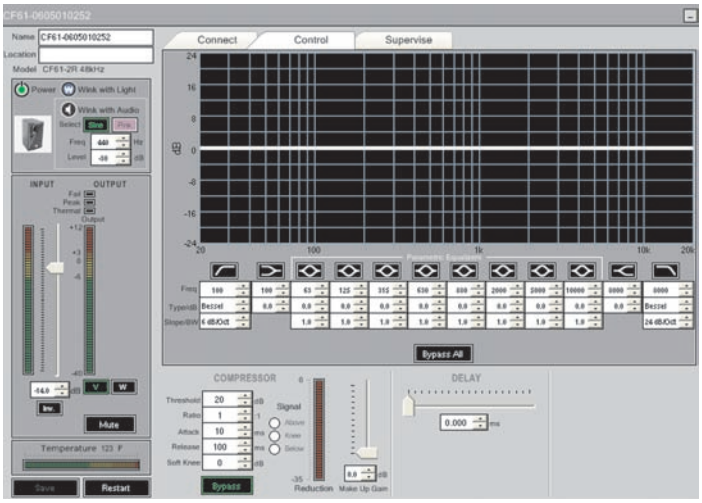


The Connect Properties window gives you the ability to:

1. Select and connect the multiple inputs of Rhaon empowered loudspeakers to the amplifier(s)

2. Select and send input and output signals to the CobraNet network

3. Select one of the CobraNet digital audio channels, if CobraNet's multi channel digital audio capability is being used.



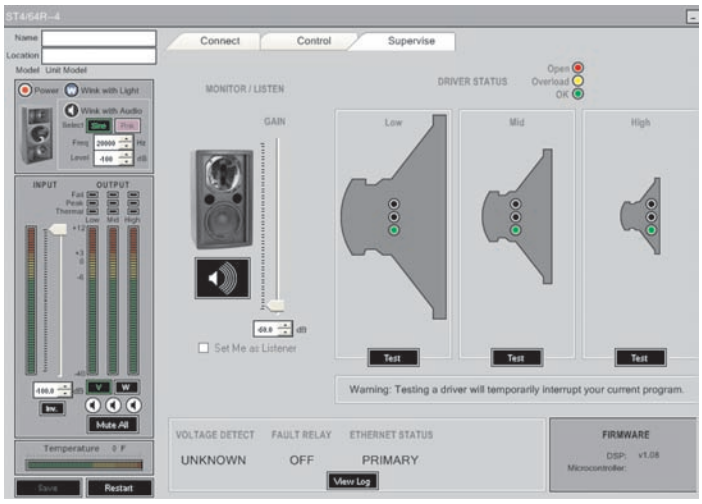
The Control Properties window provides setup and control facilities for the loudspeaker's onboard DSP. It includes controls for the:

1. Built-in compressor

2. 8-band parametric equalizer, hi & lo band rolloff and shelving filters

3. Signal delay

4. Priority override controls.



The Supervise Properties window allows you to:

1. Monitor and test the status of each transducer's driver

2. Control the volume of the monitor loudspeaker, if one is provided

3. Check the status of the voltage detect circuit, the fault relay and the Ethernet network.

The vertical pane in each properties window provides for loudspeaker identification and selected control features. See below for details.

Listing of the loudspeakers model number and the sample rate (either 48 kHz or 96 kHz) of its DSP. See Appendix III for more details.

Power button switches the amplifier(s) between On and Standby. (turning AC power on and off is an entirely manual operation.

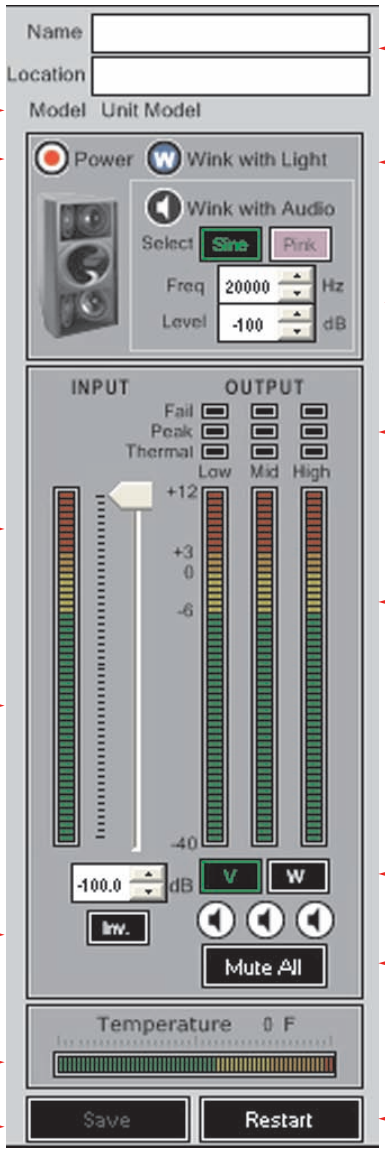
Input signal level bargraph; "0" indicates the onset of input clipping. Analog inputs clip at +12 dBu without the 10 dBa input pad, +24 dBu with the pad.

Volume control slider; adjust by grabbing slider with mouse or by using up/down arrows.Settings adjustable from "0" to -50 in 1 dBa steps, then to -100 dBa in one step; settings below -8 dBa prevent the loudspeaker from reaching full output.

Inv button inverts the input signal polarity; glows green when signal is inverted. Use with caution.

Amplifier temperature reading and bargraph.

AutoSave indicator; indicates Save for a brief period whenever a change is made to show the change is being saved.



Text fields for entering a name for the loudspeaker and listing its location.

Press Wink with Light button to turn the loudspeaker's wink light on and off to aid in identifying the loudspeaker and its location.

Press Wink with Audio to send a Tone signal or Pink Noise to the loudspeaker.

Output status indicators for each amplifier. See Status Indicators below for details.

Output bargraphs for each amplifier. "0" represents the maximum uncompressed output level; positive values indicate how far the signal is overshooting into limiting; negative values indicate the amount of headroom left before the onset of limiting.

Output meter(s) Voltage/Watts control buttons. See Output Meters below for details.

Individual mute buttons for each amplifier and a Mute All control which mutes the entire loudspeaker.

Press to restart the loudspeakers DSP in the event of a malfunction.

Status Indicators: The Thermal, Peak and Fail indicators above the output meter(s) provide critical information on the amplifiers status. The Peak indicator will flash yellow or red whenever the amplifier's peak limiter is triggered. It's normal for the indicator to flash occasionally if the loudspeaker is being used close to its rated output. Flashing frequently is a sign that the system volume needs to be turned down. The Thermal indicator will start to flash yellow as the amplifier's temperature approaches a preset level and will turn red if the temperature continues to increase as a warning the amplifier is about to be shut down. The Fail indicator glows red when the amplifier has been shut down by the protective circuitry. Heat related shutdowns will reset automatically after the amplifier cools down to a safe temperature.

As a further protective measure, the amplifier's gain will gradually be reduced in response to overheating and/or to high an input level. However, it's best to manually reduce the input signal level (overall system volume) in response to distress signals.

Output Meters: The V and W buttons below the output meters allow you to switch them from Volts (the more conventional default method) to RHAON's unique Watts meters. Watts are calculated by multiplying the actual output voltage across the driver by the actual current through it. This is more accurate than calculations using an impedance figure. Watts metering is used to quickly identify open-circuit (failed) drivers. Since open drivers draw no current, the output meter will remain at zero regardless of the input level.

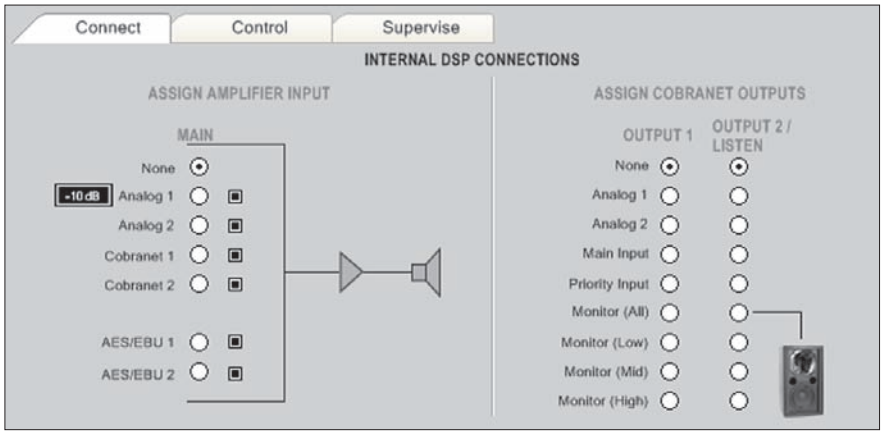
Assigning Digital and Analog Inputs

The larger right portion of the Properties windows varies with the operating mode. The Connect window is divided into an upper light grey Internal DSP Connections section and and a darker grey lower CobraNet Routing Assignments section.

The Assign Amplifier Inputs portion of the upper section is where you select which one of the Array's multiple inputs will be routed to the Main input and which one will be used for the Priority override circuit. RHAON Empowered loudspeakers have provisions for two CobraNet digital audio inputs, two analog audio inputs and a serial audio (AES3id format) digital input. Selecting the input is as simple as clicking on one of the radio buttons.

Notice that the Analog 1 input includes a 10 dBa pad. In the On position it inserts a 10 dBa pad into the Analog 1 input, allowing input signals as high as +24 dBu. Without the pad, the analog inputs clip at +12 dBu.

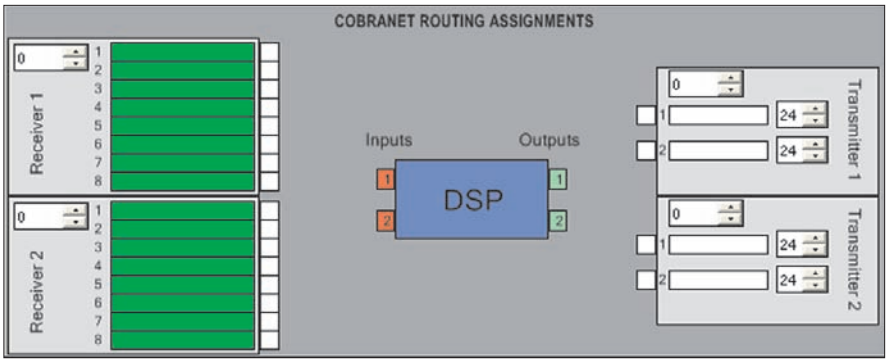
The square Signal Present indicators turn green whenever a signal is present.. You can activate any of the analog and CobraNet digital inputs in the upper group. If you select either of the AES/EBU inputs in the lower group, all Analog and CobraNet inputs are disabled.



The right hand portion of the upper section (CobraNet) lets you use any of the audio inputs or amplifier outputs as an output to the CobraNet network, except for the AES/EBU inputs. AES/EBU signals are clocked separately from CobraNet and cannot be output to CobraNet from RHAON.

You can also send composite amplifier output signals to a monitor loudspeaker located elsewhere.

The lower section is where you select the CobraNet input channel you want to use and set up the output transmitter.



You can use RHAON without digital audio distribution via CobraNet to Control and Supervise your system, or you can combine digital and analog signal distribution for redundant signal paths and/or life safety applications. However, if you use AES/EBU serial digital inputs, all other audio inputs are automatically disabled.

If you are not using CobraNet for digital audio distribution in your RHAON system, you can skip the next few pages and move on to Control mode (page 20).

CobraNet Signal Routing

CobraNet devices transmit and receive digital audio (48 or 96 kHz, 16, 20 or 24 bit) in bundles of up to 8 channels. The number of channels per bundle can vary, depending on settings for latency and resolution. The number of bundles available depends on network bandwidth.

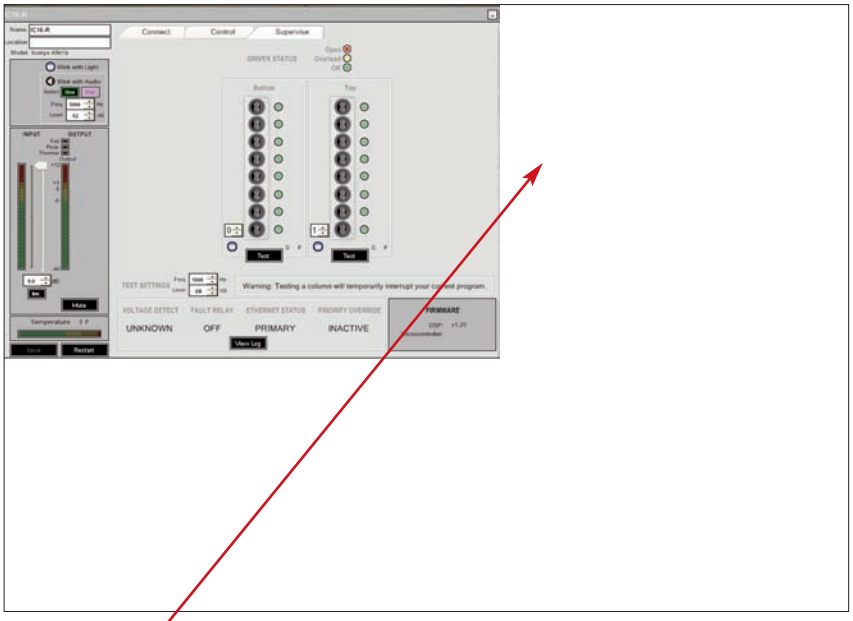
Each CobraNet bundle has a number from the following ranges:

0:	Disables the receiver or transmitter.
1 thru 255:	Multicast mode (many receivers can access the same bundle).
256 thru 65,279:	Unicast mode (allows only one receiver to receive the bundle).

In order for CobraNet devices to communicate, their Tx (Transmit) and Rx (Receive) bundle numbers must match. RHAON devices are equipped with two receivers and two transmitters, their bundle numbers must be assigned correctly so they can send and receive audio via the network. RHAON software makes this easy.

In some cases the settings of a CobraNet source will have already been established with the source's own proprietary software and can be changed only with the manufacturer's software.. However, if allowed by the manufacturer, you can set or reset both receiver and transmitter bundle settings of any device found on the CobraNet network using RHAON software.

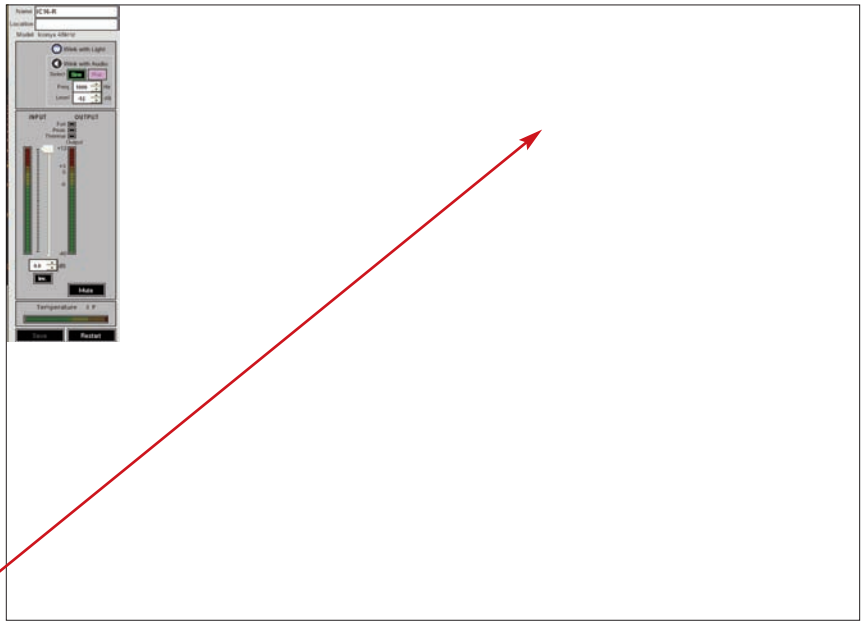
The first step in setting up CobraNet routing is to drag the CobraNet Source that was detected by Scan Network into the system.



CobraNet Source

The CobraNet Source and the devices connected to it must have the same Sample Rate and Latency settings. Right clicking on the CobraNet Source Icon will open a pop up screen showing the Sample Rate and Latency settings. We suggest you accept the Source's default settings unless you have a specific reason to change them.

You will then want to check the device settings to make sure they are the same as the Source's settings. The settings must be the same for the source and for all devices connected to it.

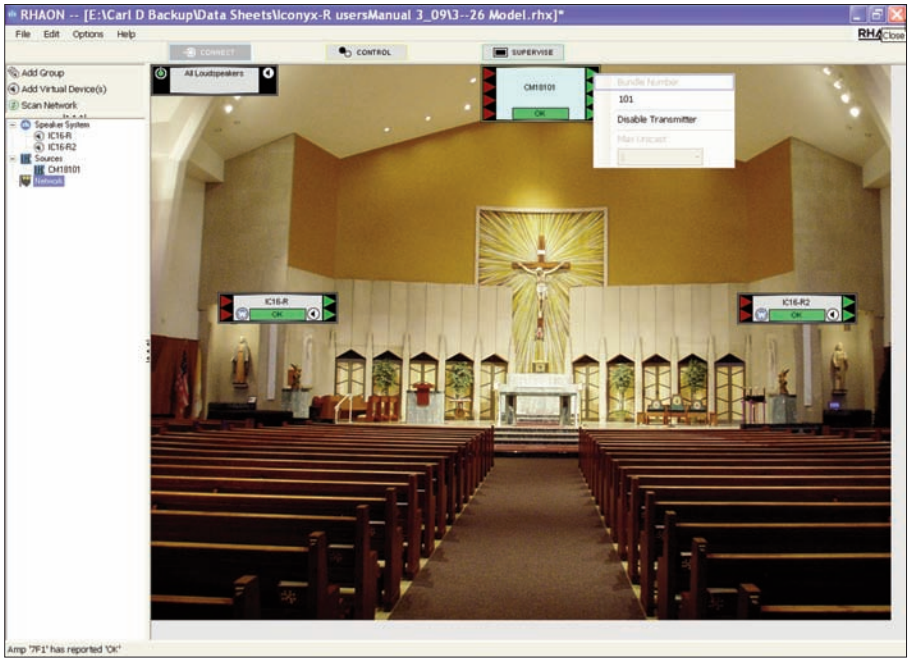


While latency may be changed here via point-and-click, sample rate is pre-programmed in the DSP firmware running in the loudspeaker. You can switch sample rate by uploading the appropriate firmware to your device. Please refer to "APPENDIX III: Updating DSP Firmware" for information on how to upload new firmware to your device.

CobraNet Source

Next, check the bundle settings of the CobraNet Source device. The Source in our example has 4 Receivers and 4 Transmitters. The red triangles on the left of its icon represent Rx bundles and the green triangles represent Tx bundles. Right clicking on one of the triangles will open a pop up window that shows the bundle number.

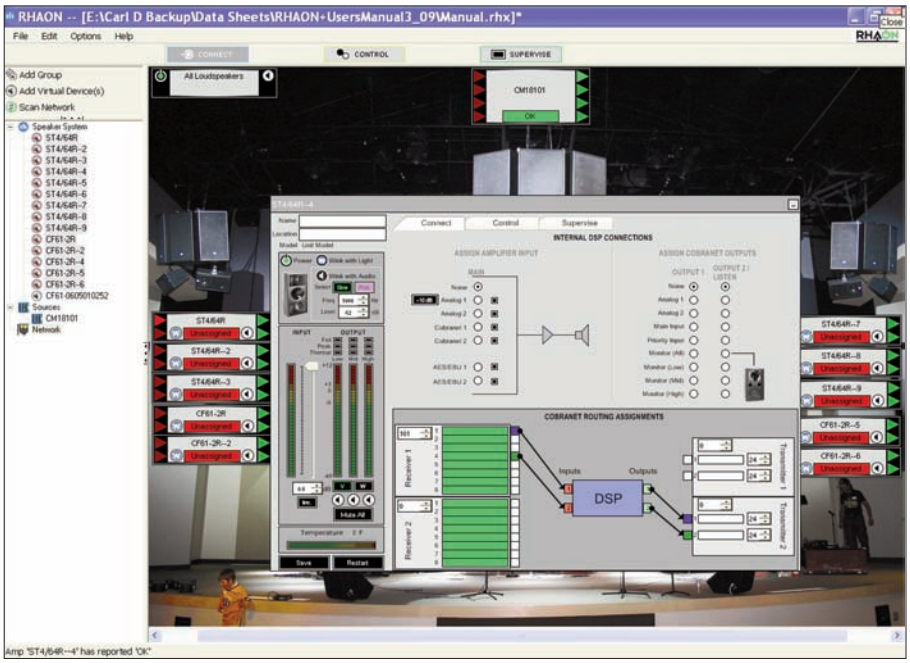
The next step is to connect CobraNet Source Transmitters to the CobraNet Receivers in the RHAON loudspeakers. Click on one of the Source's green Tx arrows and then on one of the loudspeaker's red Rx arrows to connect the two. The loudspeaker's Receiver automatically inherits the bundle settings of the Source Transmitter. Keep repeating these steps until all the loudspeakers are connected.



To correct a mistake or change an assignment, click on the Receiver whose assignment you want to change to select it or right-click on the Receiver Icon and select Disable Receiver from the menu that pops up. Either method will break the connection and allow you to make a new one.

Since each CobraNet bundle can carry 8 channels of digital audio, you must make channel selections individually.

Once your Tx and Rx bundle assignments have been made, open each loudspeaker's Properties window by double-clicking its icon. If the window does not open in Connect mode, click on the Connect tab at the top to display the window shown at the right.



In the lower-right section of this window, you make channel assignments by clicking on one of the white bundle tabs and then on one of the DSP input tabs to connect audio channels from the CobraNet source to the RHAON loudspeaker's CobraNet Receivers.

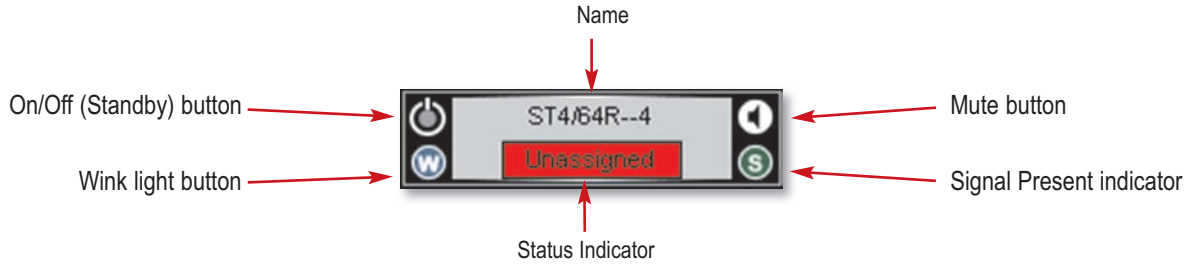
You can also assign Outputs 1 and 2 (selected under Assign CobraNet Outputs) to the RHAON loudspeaker''s CobraNet Transmitters.

CONTROL MODE

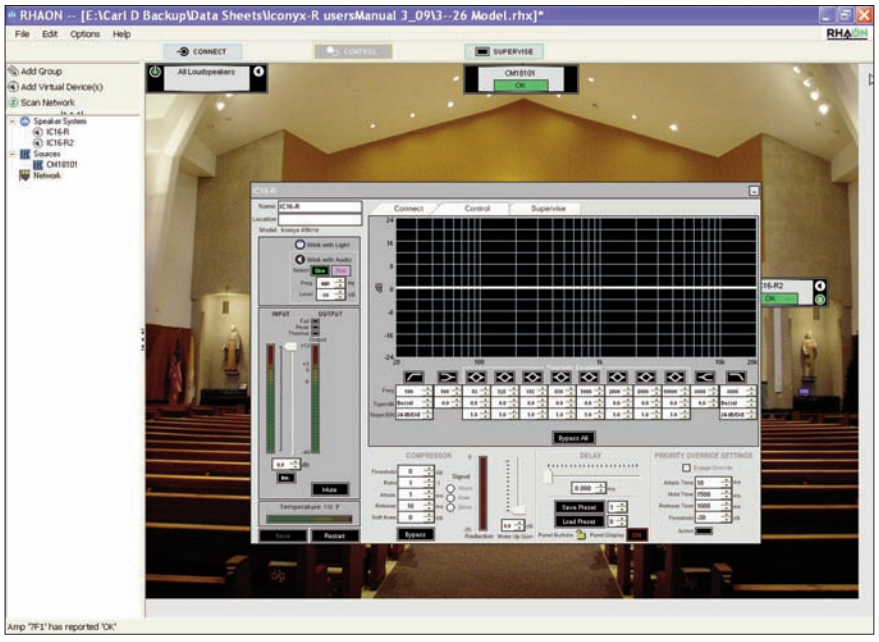
Control Mode provides access to the Loudspeaker Amplifier's internal DSP and allows you to control its settings. You can enter Control Mode by clicking on the CONTROL button at the top of the main workspace, or from within any loudspeaker's Properties window. Any or all of the Control functions can be restricted to authorized operators who have password access; more information on password authorization can be found in the Supervise Mode section of this manual.

When you enter Control mode in the main workspace, the directory tree on the left remains the same.

However, notice that the icons themselves have changed. The CobraNet Rx and Tx arrows are gone. On the left, an On/Off button allows you to switch the amplifier(s) On or select Standby (Off) mode. The Wink button is below this switch. On the right, a Mute button is labeled with a driver symbol. Below it is a Signal Present indicator.



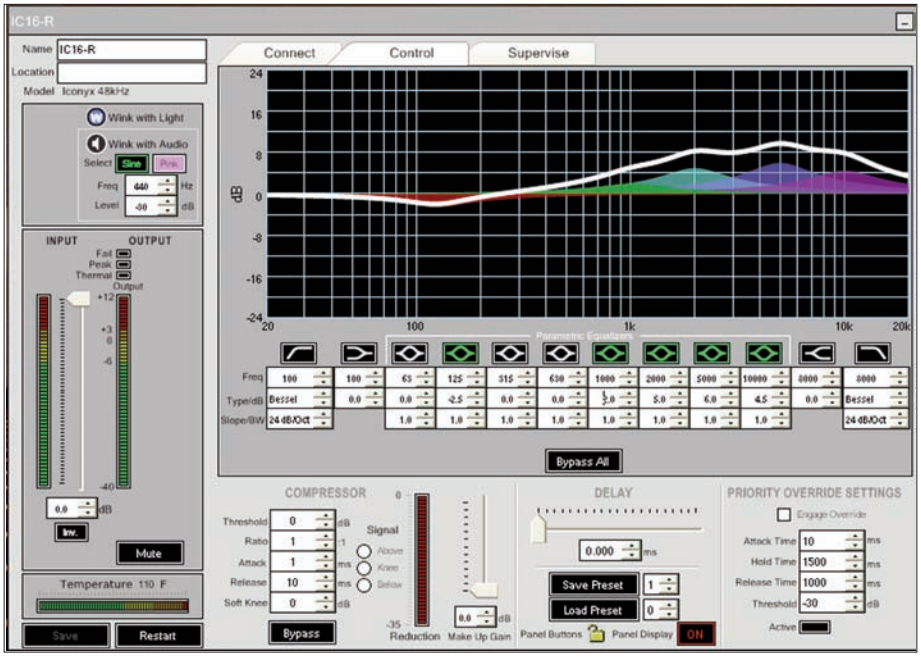
Double-click a loudspeaker icon to open its Properties window in Control mode. Notice that the left hand section of the Control mode Properties window is the same as in Connect mode.



On the right side of the Control Properties window, in the upper dark grey section, you will see a frequency response graph. Underneath it are controls for 12 filters. To select a filter, click the button above its white data fields; then either type in your values, use the up-down arrows or scroll with your mouse to adjust the parameters. At the far left is a highpass filter; its lowpass counterpart is at the far right. These filters have three controls: Cutoff Frequency, Type (Bessel, Butterworth, etc.), and Slope. The pair of filters to the inside are shelving filters, with controls for corner frequency and boost/cut.

The center section gives you control of 8 fully parametric filters, with controls for center frequency, boost/cut and bandwidth in octaves. When you activate a filter, its button turns green and it appears on the graph – each filter appears in a different color. A solid line shows the overall EQ curve. The Bypass All button at the bottom of this section lets you compare filtered and unfiltered signals quickly.

All filter parameters can be controlled with the scroll wheel on your mouse. Click inside the control field and scroll to set: Gain, Bandwidth, Frequency, etc.

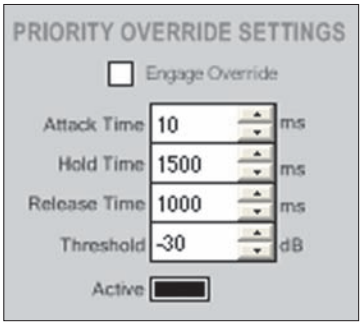


Below the EQ section in the light grey area, you'll find a Compressor on the left. The controls – Threshold, Ratio, Attack Time, Release Time and Soft Knee – are similar to the EQ controls. You can type in values, use the Up/Down buttons, or scroll with your mouse to find the values you want. Under Signal you will find buttons that set the compressor's trigger point Above, At or Below the Knee. When the compressor is operating, the Bypass button is red and the Gain Reduction meter on the right side of this section lights up. To turn the compressor off or compare the uncompressed output, click the Bypass button.

To the right of the compression Reduction Meter is the Make-Up Gain control. This control can be used to restore RMS levels of the compressed signal to those expected of the signal pre-compression. It has a range of 0 to +12 dBa.

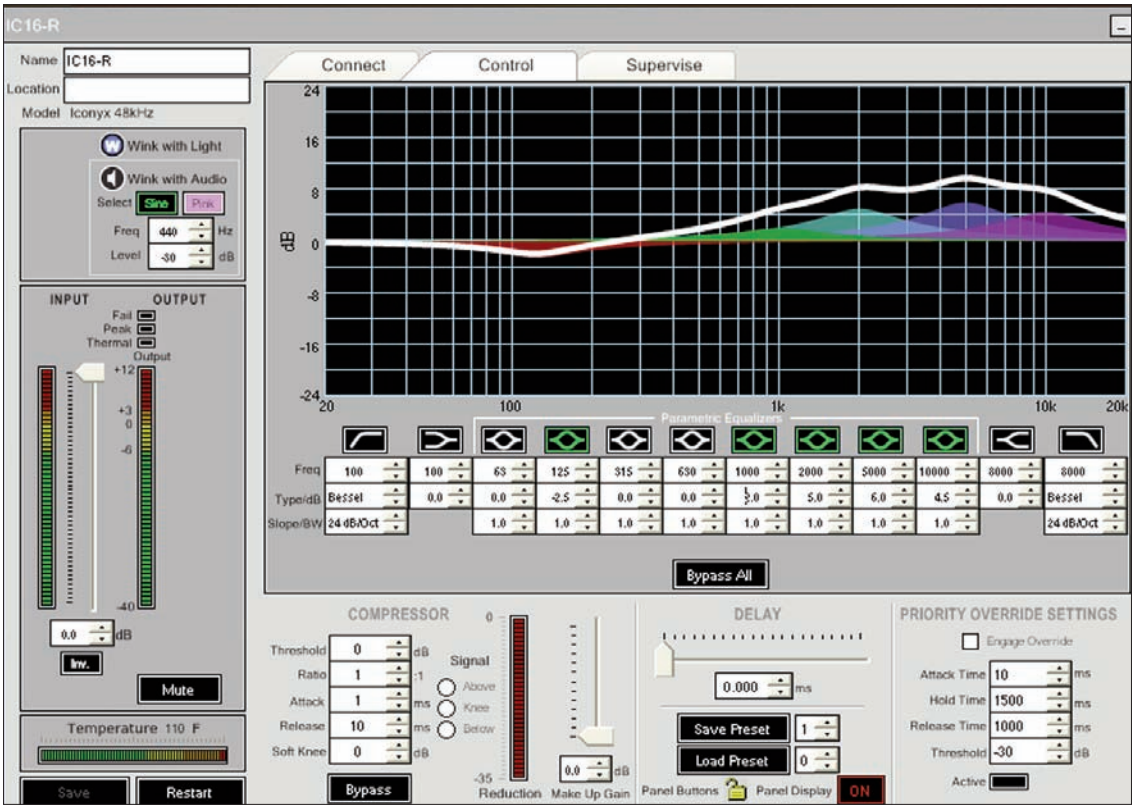
The RHAON input module's DSP has 340 milliseconds of signal delay available if you are using the 48 kHz sample rate; 170 milliseconds if you are using 96 kHz. Use either the up-down arrows or the slider control to adjust the delay time.

Priority Override is one of the unique features of RHAON. It allows you to assign signal-activated priority override capabilities to any one of the array's multiple inputs. The Priority Override controls in the lower right section of the properties window allow you to set the Attach Time, the Hold Time, the Release Time and the Threshold level.



Saving Changes

At the bottom left of each Properties window is a blank black bar. When you make changes to the loudspeaker's settings, the word Save will briefly appear in this space. This lets you know that your changes are automatically being sent to the loudspeaker's onboard DSP memory.



You will also be prompted to Save Your Project before you exit the RHAON software.

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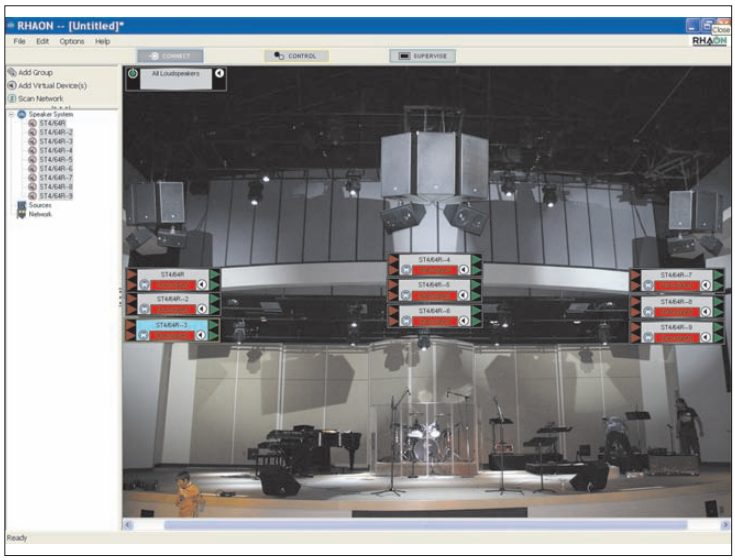
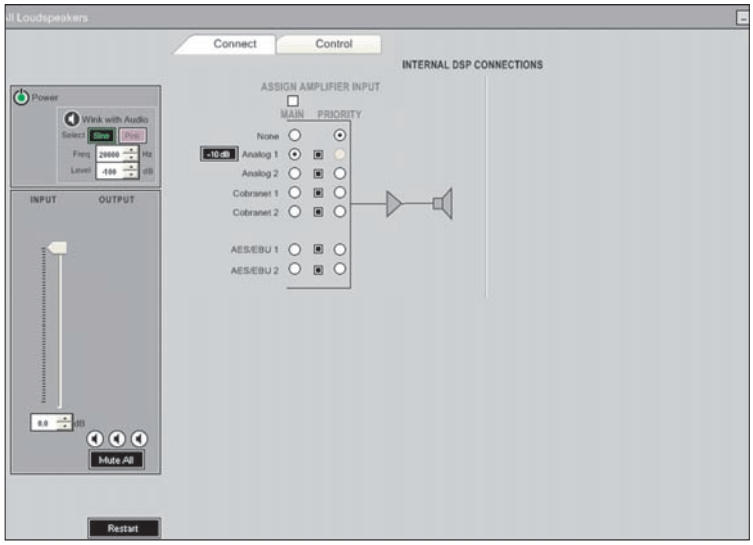
All Loudspeakers Control Window

So far we have paid little attention to the All Loudspeakers icon in the upper left of the work space. It represents all the loudspeakers in the system and allows you to Mute all the loudspeakers simultaneously or to turn them all On or Off with the push of a single button.



The All Loudspeakers Control feature also lets you assign Input connections, EQ, Delay and Compression settings for all the loudspeakers in the system at one time or adjust their sound level with just one control. It's a great time saver.

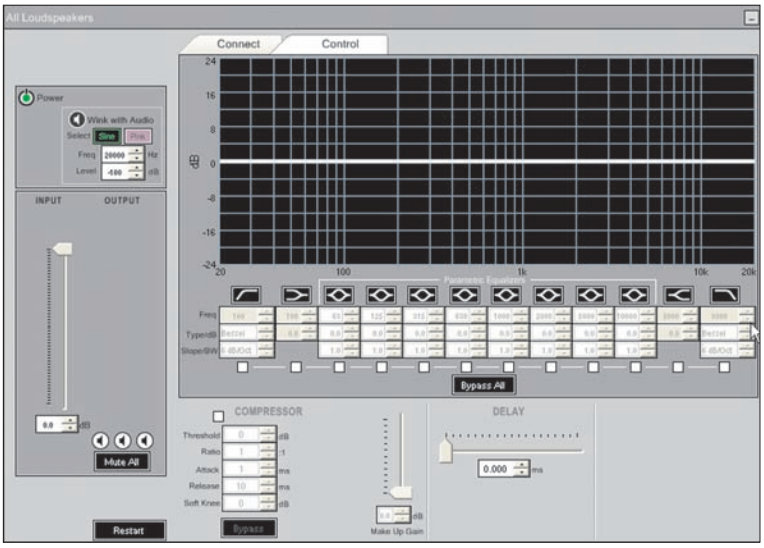
Double clicking on the Icon will open the Connect Properties folder. Notice that the All Loudspeakers Connect window shown here is very similar to the one for individual loudspeakers except for the lack of level meters and CobraNet channel selection facilities.



The All Loudspeaker Control window is highly similar to the one for individual loudspeakers except for the lack of meters and the addition of a row of Group Assign boxes under the EQ filters.

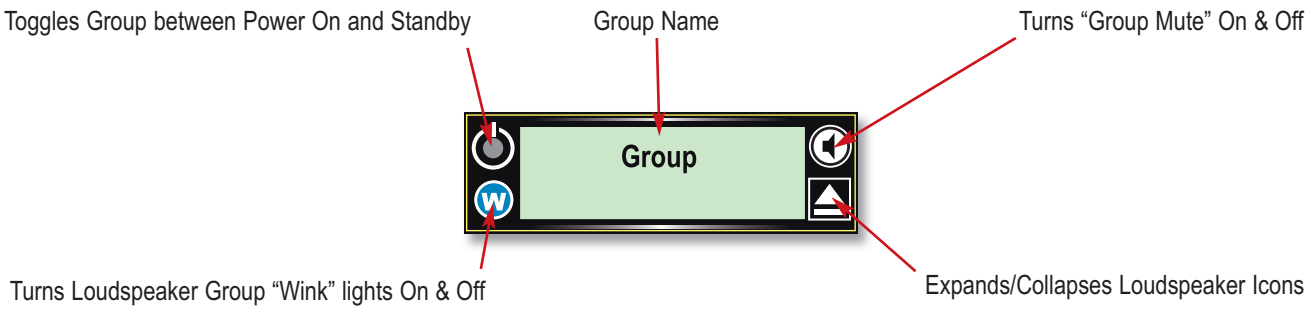
When the Group Assign boxes are checked, the Group Settings override individual loudspeaker settings - that is, the settings defined in this window will be uploaded to all loudspeakers in the system and override the settings in the individual loudspeakers.

Any items that are not assigned to the Group Settings will remain under the control of each loudspeaker; for example, if the High and Low Frequency Rolloff controls are not checked then each loudspeaker's high and low frequency rolloff can be adjusted in the individual loudspeaker's Control window.



Group Control

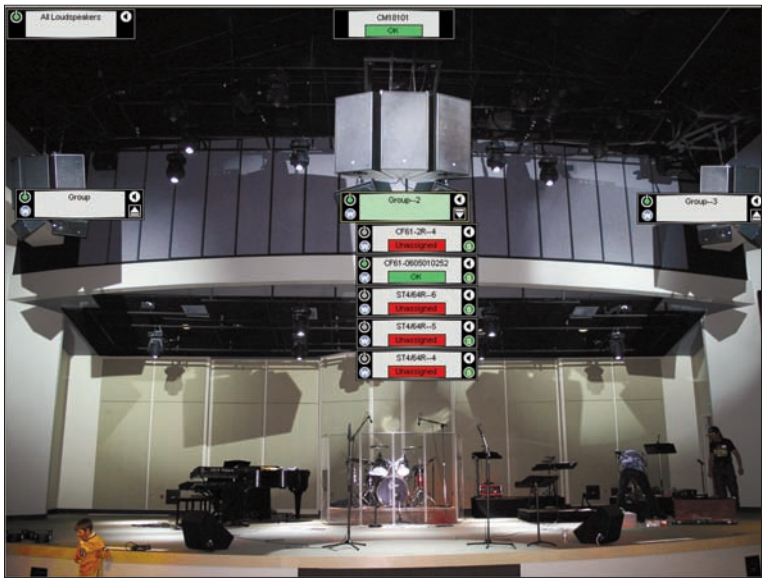
RHAON software allows you to create Groups of loudspeakers and also set up Groups of loudspeakers within a single master Group. Clicking Add Groups in the toolbar adds a group to the System listing tree and puts a Group icon into the workspace on the right. Our example Left-Center-Right array system is a natural for 3 Groups.


Toggles Group between Power On and Standby
Group Name
Turns “Group Mute” On & Off
Group
Turns Loudspeaker Group “Wink” lights On & Off
Expands/Collapses Loudspeaker Icons

You add Loudspeakers to the Group by dragging and dropping their listing in the Systems tree into the Group listing. When they are added to the Group,the loudspeaker icons will disappear into the Group icon. To view all the loudspeakers in the Group, click on the Expand/Collapse toggle at the lower right of the Group Icon.

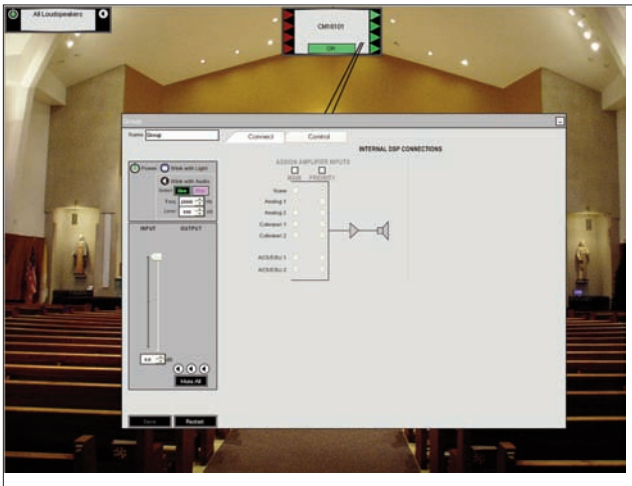
Note that loudspeakers within a group are linked to the Group Icon and cannot be individually moved around the work space.

Double-clicking on the Group Icon will bring up the Group Properties window.



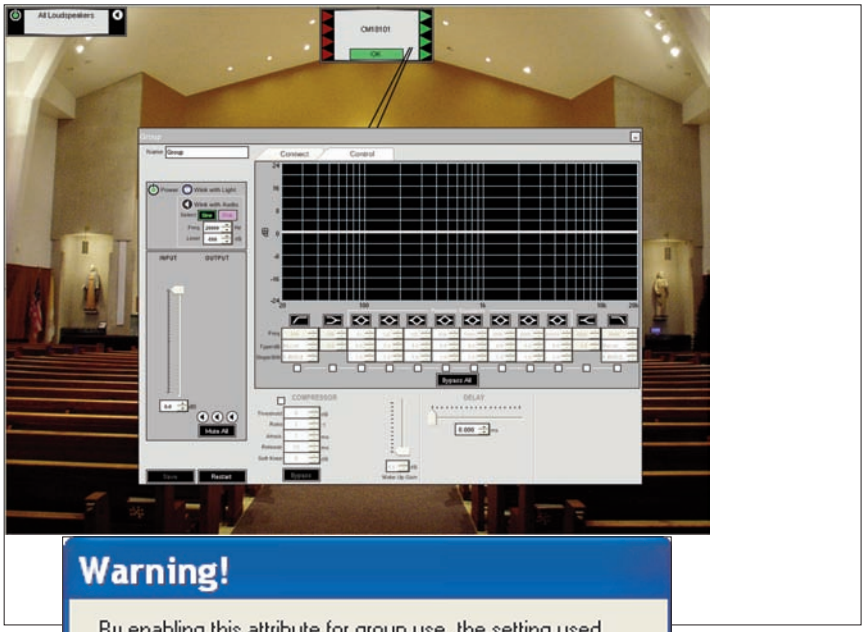
The Connect Properties window has the same controls found in any individual loudspeaker’s Properties window, except for the lack of meters and CobraNet channel selection facilities. Use the Name field at the top left to give your loudspeaker group a name that’s more informative than “Group.”

In the dark grey area on the left are Power, Wink with Light and Wink with Audio buttons. These tools are similar to those in a Loudspeaker Properties window, but of course they “Wink” the front grill lights of all the loudspeakers in the group, or send an audio signal (tone signal or pink noise) to all of the loudspeakers in the Group. In a similar fashion, the Power button puts all amplifiers in the Group in Standby or turns all of them On. The Volume slider control and Mute button also affect all amplifiers in the Group. Group metering is not available.



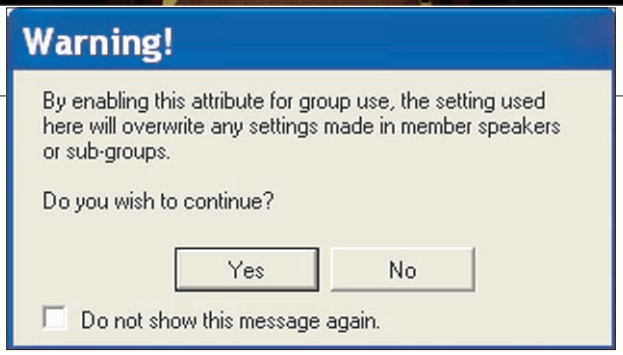
The Input selection radio buttons in the light grey area operate in the same way these controls operate for individual loudspeakers, but control all loudspeakers in the Group.

When you work in a Group window, your control settings are applied to the onboard DSP in every loudspeaker in that Group. Input Gain, Compression, Delay and Priority Override settings made in a Group window will be the same for every loudspeaker in the Group, and you will find those controls "grayed out" in the individual loudspeaker's Properties windows to show that they are unavailable. But if you don't check the Group Assign boxes on all 12 EQ filters at the Group level, the remaining filters will be available in each loudspeaker's Properties window.



A Group Control mode window is identical to the one used for individual loudspeakers except for the lack of level meters and the addition of a row of Group Assign boxes under the EQ filters and next to the Compressor.

When the Group Assign boxes are checked, Group EQ and dynamics settings override individual loudspeaker settings – that is, the settings you define in the Group window will be uploaded to all loudspeakers in the Group. Any EQ filters you do not assign to Group-level control will still be available within each individual loudspeaker.

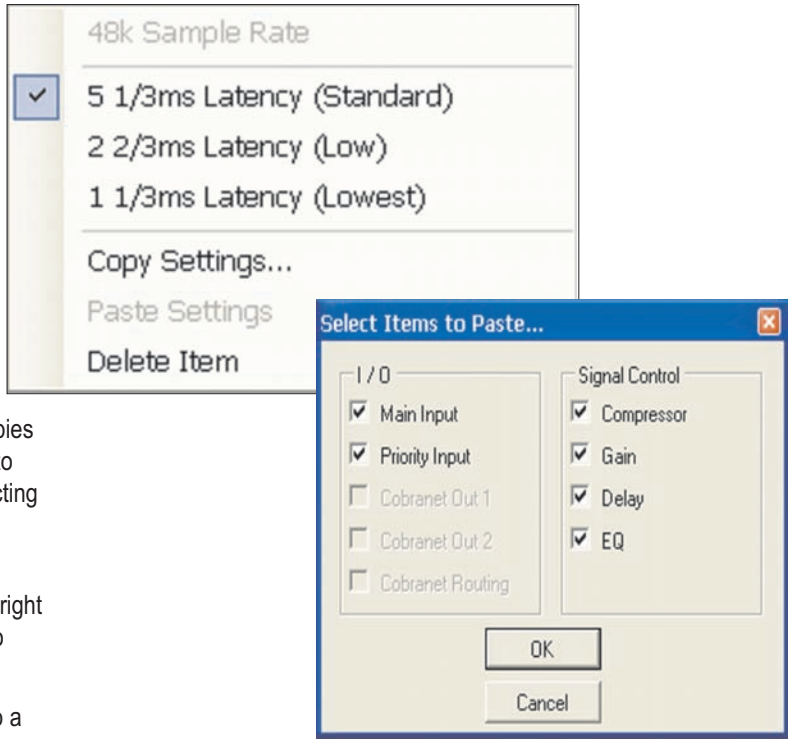

Warning!
By enabling this attribute for group use, the setting used here will overwrite any settings made in member speakers or sub-groups.
Do you wish to continue?
Yes
No
Do not show this message again.

Whenever you assign an EQ filter or the Compressor to Group-level control, RHAON pops up a Warning prompt to remind you that you will be overwriting individual loudspeaker settings.

Copy / Paste Shortcut

Copy Settings is a useful RHAON feature that can save you significant time on large multi-loudspeaker projects.

Right clicking on any of the Loudspeaker Icons while in either the Connect or Control mode introduces a pop up menu that includes a Copy Settings command line. Selecting Copy Settings copies all that loudspeaker's DSP settings and allows you to copy these settings to another loudspeaker by selecting its Icon and using Paste Settings.



Right clicking on another loudspeaker and pressing Paste Settings introduces the window shown to the right which allows you to select what settings you want to Paste (transfer) into that loudspeaker.

You can also Paste the Gain and Delay settings into a group of loudspeakers.

SUPERVISE MODE

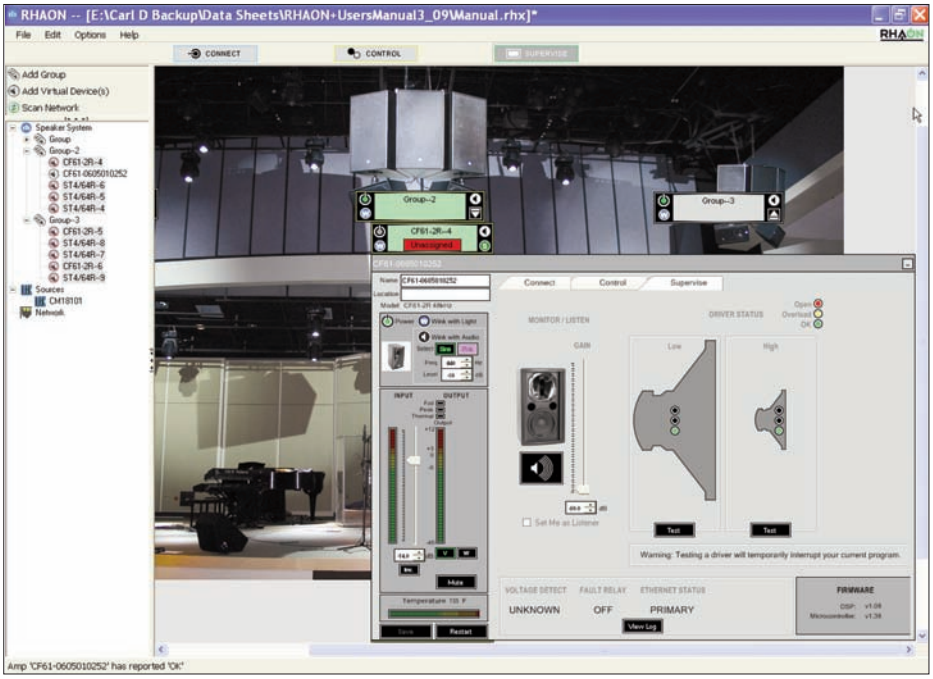
RHAON's Supervise mode is the one you will use most while your system is in operation (i.e., making sound). It is designed to empower system operators with a comprehensive set of monitoring and loudspeaker/amplifier management tools. In Supervise mode, you can quickly detect a problem anywhere in the system and (if you have access to the appropriate Control mode functions) take corrective action. To switch from Control Mode to Supervise Mode, click on the Supervise tab in either the main workspace, or in a Group or Loudspeaker Properties window.

The main Supervise screen is similar to the Connect screen. It shows your system layout in icon form. The Status field at the bottom of each icon allows you to monitor all Loudspeakers or Groups at a glance. This field will change color and display a text message that indicates the status of the loudspeaker. If there is a problem with any loudspeaker in a Group, that Group's icon will change color and display a text alert.

In Supervise Mode, each Status Indicator will display one of the following colors and messages

COLOR	MESSAGE	STATUS
GREEN	Online	This loudspeaker is (or all loudspeakers in this Group are) connected and operating
YELLOW	Overload	Amplifier is being overdriven
RED	Unassigned	Virtual loudspeaker has not been assigned to a physical loudspeaker
RED	Offline	Loudspeaker has lost power or been disconnected from the network
RED	Driver Open	One of the loudspeaker's drivers has failed
RED	Hot	An amplifier's over temperature circuitry is engaged
RED	Amp Fail	An amplifier has failed

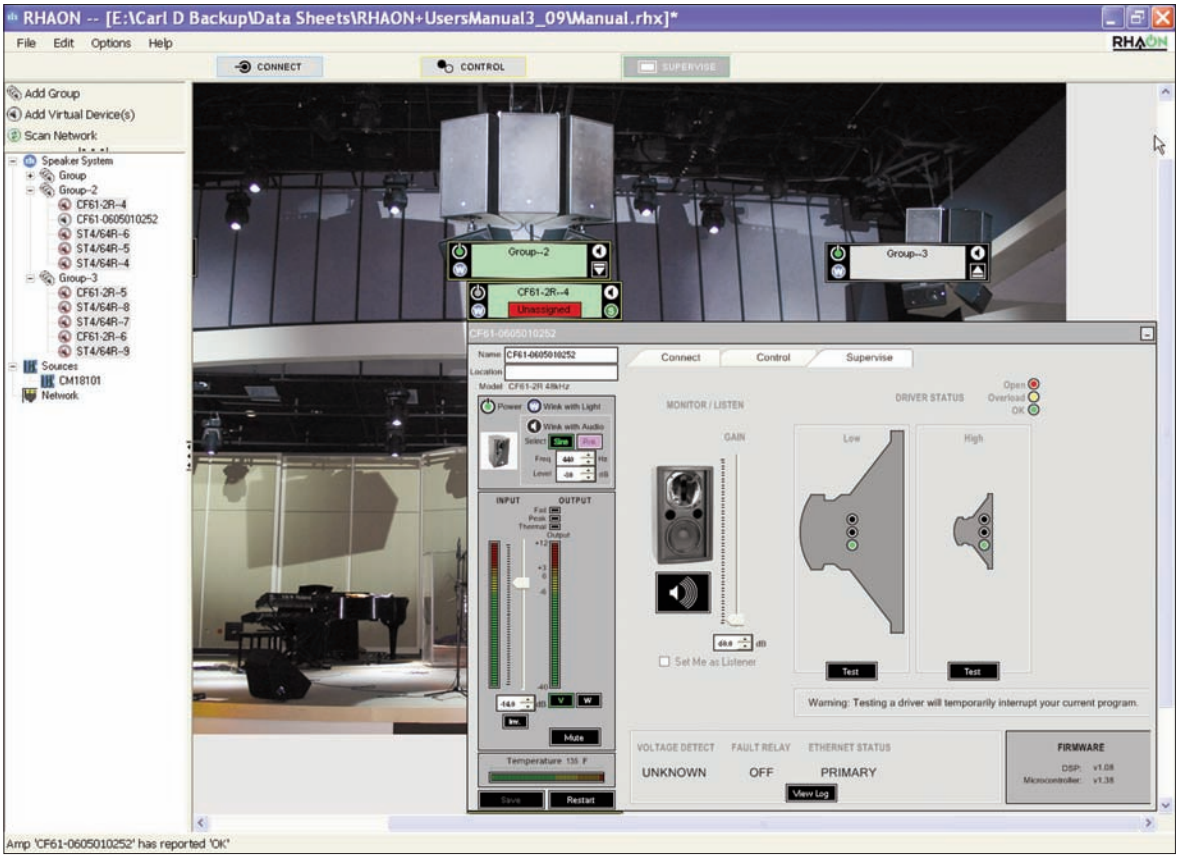
If a Group icon displays an alert (yellow or red bar with text), double-click it to Expand it and show all of its Loudspeaker icons. One of more of these icons will display the same alert: double-click it to open the loudspeaker's Properties window in Supervise mode, as illustrated below.



The dark grey section on the left is identical to Control Mode. It includes the loudspeaker's input and output monitoring facilities, identification fields, and basic operating controls: Power On/Standby, the Wink Light toggle, Wink with Audio, Volume, Polarity Invert, and Mute. Any or all of these controls may be restricted to authorized operators and subject to password-protected access.

The transducer icons on the right each have a "traffic light" status indicators. Green for all OK and red for driver failure. Yellow indicates the driver has been repeatedly driven far enough into limiting that its normal life span may be reduced

The traffic light conditions are mirrored in the status field of the supervise icons. Driver conditions are dynamically supervised with program material but an additional test button can confirm coil status. The use of these manual test buttons is required in case the program material either lacks specific frequencies or is too weak.



The loudspeaker's RHAON Microcontroller and DSP Firmware version and MAC (Machine Access Control) address are shown in a darker grey panel at the bottom right of this window.

The panel at the bottom shows alerts for Voltage Detect, Fault Relay, Ethernet and Priority Override status.

The Priority Override indicator will change from showing "Inactive" to "Active" when the override circuit is in use (has been activated).

The Fault Relay status line will change from "Off" to "On" when an amplifier fault has been detected or the Ethernet carrier signal is lost.

The Voltage Detect will read "High" when it senses a voltage on the Sense input line and "Unknown" when no voltage is present.

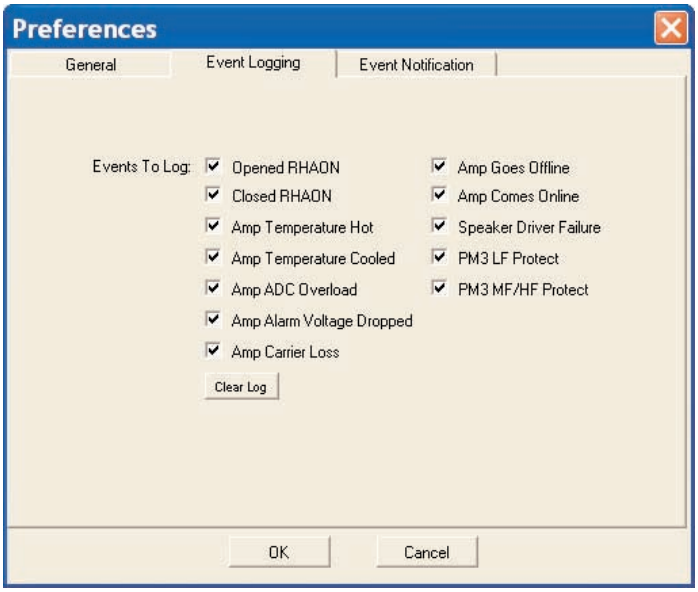
The Ethernet Status will show "Primary" when an Ethernet Carrier signal is detected at the Primary Ethernet input and "Off Line" if the carrier signal is lost, except in "Redundant" systems having a secondary Ethernet source. In these systems, the amplifier will be switched over to the secondary input as soon as the primary signal is lost; the status line will then change to Secondary".

Event Logging & Notification

RHAON's Event Logging function can record events of the types you select in a .log file. This allows the system's operating status to be reviewed at any time. Audio evacuation and life safety systems are often required to provide this type of logging.

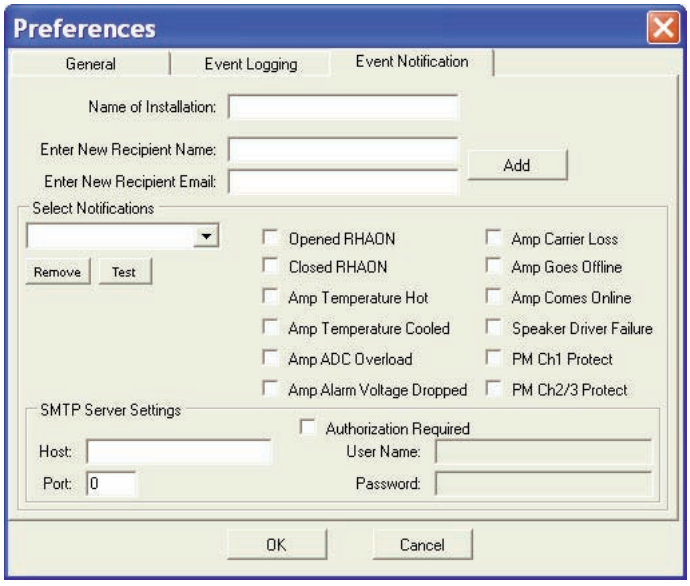
To activate this feature, go to Options in RHAON's main tool bar and select Preferences; then open the Event Logging folder. Select the event types you want to log using the check boxes next to each type of event.

Click on OK to activate Event Logging. The log file will be written to the computer's hard drive in a RHAON.log file in the Program Files/Renkus-Heinz directory.



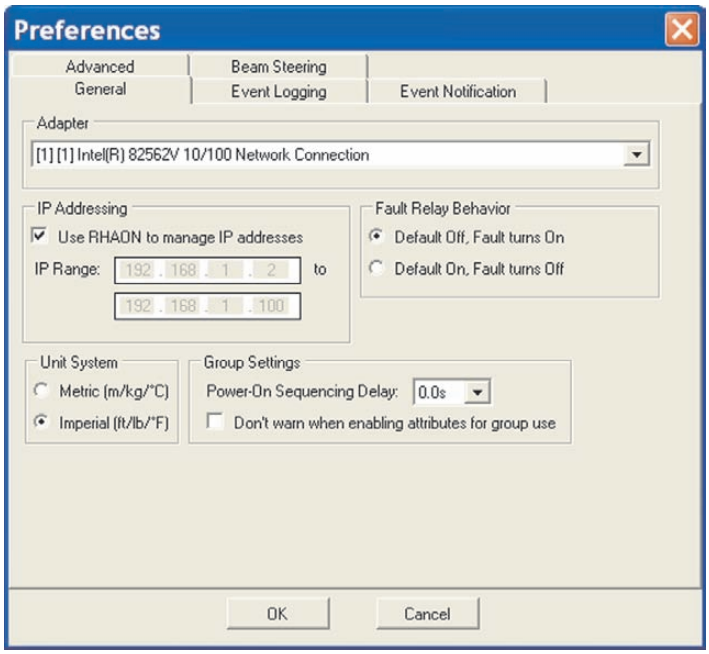
RHAON can also automatically e-mail events to another computer or cellular phone. You configure this function in the Event Notification folder next to Event Logging. As with logging, you can choose the types of events for which you want RHAON to send e-mail notifications.

Because RHAON connects to a NIC (Network Interface Card) with a local IP address, you will need a second NIC in your computer to connect to the Internet. You will also have to specify the SMTP (Simple Mail Transfer Protocol) host and a valid e-mail account in order for RHAON to send e-mail. An IT professional may be able to assist you with these tasks if you need help.



General Preferences

While you are setting up RHAON's Preferences, you can click on the General tab to review the program's default settings and change them if necessary. We already discussed the selection of a Networking Adapter (aka NIC) in the Connect section of this manual. Unless you are a networking expert you should leave the default settings under SNMP (Simple Network Management Protocol) Variable Retrieval alone: SNMP is not as simple as its name implies. IP Addressing is also covered in the Connect section of this manual. After your network is set up and operating there should be no reason to change these settings.



Change the units of temperature (Fahrenheit or Centigrade) to ones that are most useful to you and your fellow operators.

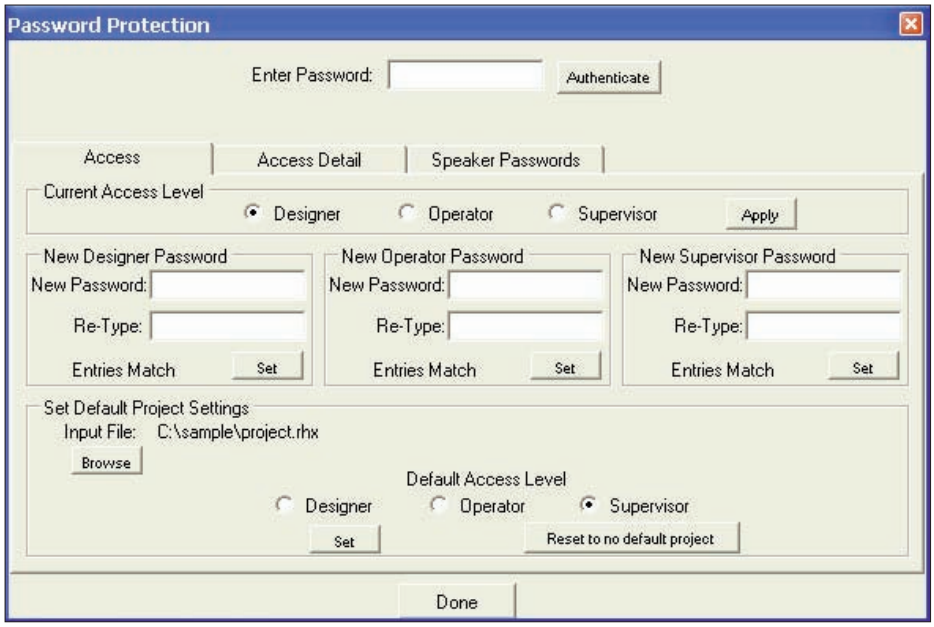
Under Group Settings, you can set up a Power On Sequencing Delay for all grouped loudspeakers. This will help avoid a voltage surge that can trip building circuit breakers. Depending on the delay interval you select, there will be a .5, 1.0, 1.5 or 2.0 millisecond turn-on delay between each amplifier in the Group.

Password Protection

RHAON software includes three levels of password protection. This features is designed to prevent inadvertent changes of Connect and Control Mode settings by anyone who is unauthorized or unfamiliar with the system.

To open the Password Protection setup window shown below, hit **Control-Alt-p**.

You can set up three levels of control access. They are called Designer, Operator and Supervisor. Each access level should have its own password.

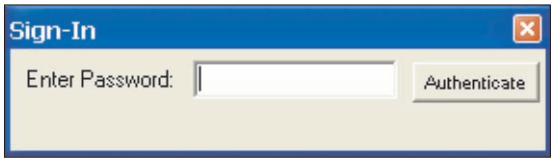


The Designer has the highest level of access. This person should set up the access control system and passwords before turning a RHAON system over to its owners and operators.

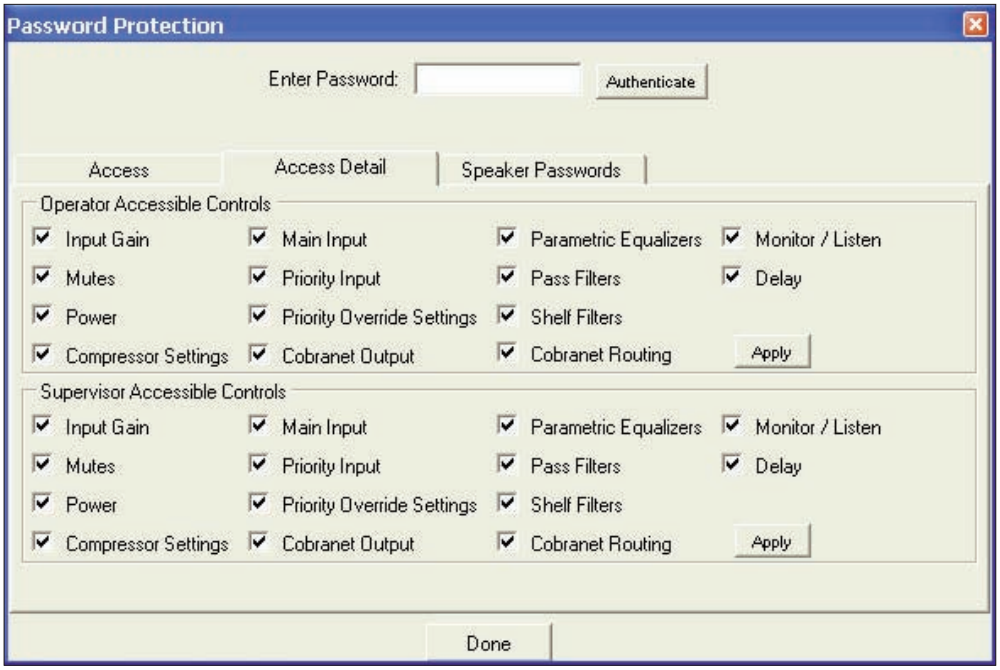
The Operator has the next highest level of access. We suggest giving an Operator access to all Control Mode functions that would normally be used while running a show or operating the system. In a fixed installation, Operator level personnel would probably not be granted access to the Compressor, EQ, Delay, Shelving and Rolloff controls, but they would be able to adjust the volume if necessary to respond to clipping and/or over temperature alerts.

The Supervisor access level is intended for those who are only monitoring (supervising) the system for faults and failures. Supervisors would normally be given access to few, if any, of the functions in Control Mode.

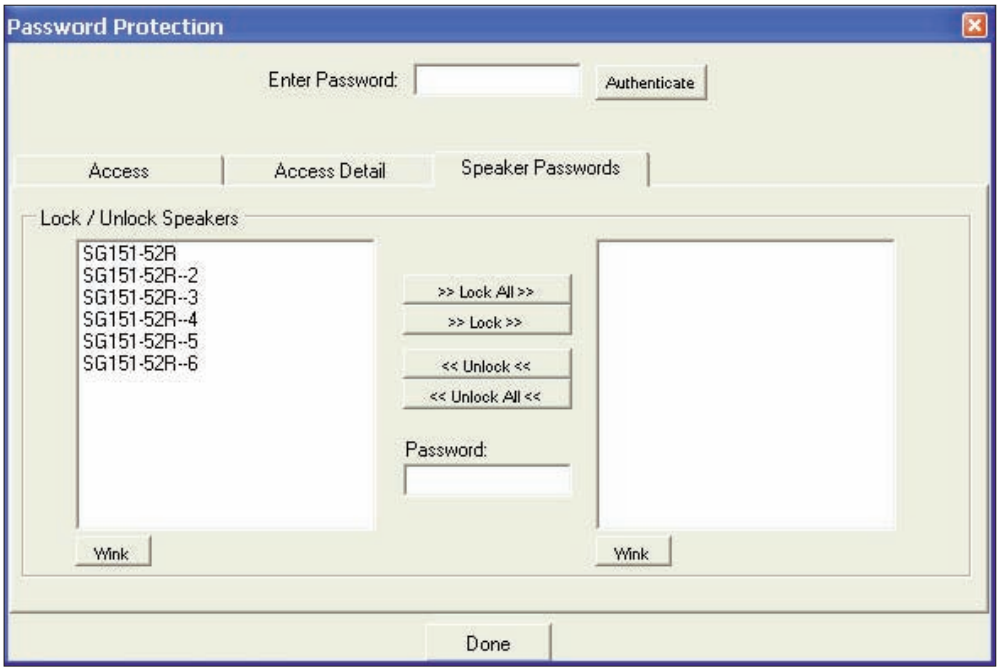
RHAON passwords are case sensitive. Once the password access system has been set up it will be impossible to operate RHAON without entering a password. The Password Prompt shown below will appear each time the program is opened and a proper password must be entered before proceeding.



Clicking on the Access Detail tab opens the window shown below. Its settings determine what control features will be available to "Operators" and "Supervisors". These settings are themselves password protected and can only be changed by a Designer.



The Speaker Protection window provides an additional level of protection, as it allows the settings for individual loudspeakers to be locked to positively prevent their being accidentally changed. This feature allows a Designer to grant an Operator access to Group level controls, for instance, but to lock out all settings for the individual loudspeakers within the Group.



APPENDIX I: Audio Evacuation & Life Safety Functions

Although not certified as a “Life Safety” system, RHAON has been designed to meet the stringent requirements of most Audio Evacuation / Life Safety system specifications.

Since “Life Safety” requirements vary widely from country to country and from one locality to another, we strongly recommend you contact your local authorities for an opinion before proposing a RHAON system for any Life Safety application. They know best what’s required in your area to meet code requirements.

A summary of RHAON’s life safety features follows.

Redundant CobraNet Inputs

All RHAON Empowered amplifiers have a secondary Ethernet input that can be used to provide a “redundant” control and distribution system. Such systems, of course, also require a redundant Ethernet system. Changeover to the secondary or redundant system is automatic in the event the primary system fails.

Continuous Performance Monitoring

The performance of all RHAON Empowered Amplifiers and Loudspeakers is constantly monitored for faults and abnormalities.

Event Logging and Notification

Pre-selected events are recorded in a Log file for later review and analysis; may be automatically forwarded via e-mail to another location.

Fault Monitoring

An opto-isolated input monitors the integrity of an external wiring loop by detecting the presence of a “sense” voltage and reporting its absence via the Ethernet network.

Fault Relay

An isolated relay uses external wiring to report any amplifier fault, including the loss of the Ethernet carrier, to associated equipment. Normally Open & Normally Closed contacts handle up to .5 Amp @ 28 Volts AC or DC.

Appendix II: RHAON Hardware Inputs, Outputs & Indicators

To connect a RHAON network, you first make hardware connections, and then (if you are using CobraNet for digital audio distribution) assign signal routing using RHAON software. Since all Ethernet connections are made using RJ45 connectors and standard Ethernet hardware, the network infrastructure is cost-effective and easy to install. You can also connect Serial Digital (AES3id aka AES/EBU) and analog audio to a RHAON-Empowered loudspeaker, as well as Fault Detect and Fault Relay lines. A typical RHAON Input Panel is shown below.

Power LED
Glows when the amplifier is On and not in Standby

Thermal LED
Lights to indicate that an over-temperature sensor has shut down the amplifier.

Primary Analog Input
XLR female
pin 1 chassis, pin 2 +, pin 3 -

Looping Analog Output
XLR male
pin 1 chassis, pin 2 +, pin 3 -

Overdrive LED
Flashes red when the Primary Analog Input preamplifier is being overdriven (input clipping)

Signal LED
Flickers when an audio signal of at least -30 dBu is present at the primary analog audio input.

Input Pad & LED Indicator
On / Off 10 dBa pad for Primary Analog Input; allows input signals of up to +24 dBu when inserted manually or via computer control. Note: this pad does not affect the +12 dBu maximum input level of the Secondary Analog Input

Push Button Volume Controls
Also function as a manual Standby/ON control; see Power ON/Off Switch
Note: output level is also computer controlled

Mute Buttons
Turn Loudspeaker muting on and off; muting is also computer controlled

Primary & Secondary Ethernet (CobraNet) Inputs
RJ-45 female
When both are connected, changeover to Secondary is automatic if Primary fails. Yellow LED flashes when the connector is active, glow steadily when data is streaming. Green LEDs glow when connected but inactive, turn Orange to indicate a faulty connection.

Secondary Analog Input
Phoenix connector
pin 1 +, pin 2 -, pin 3 chassis
can be configured as a "priority override" input

Serial Digital Audio Input
Phoenix connector
pin 3 chassis, pin 4 +
AES3id format; automatically disables all other inputs when in use

Fault Detect
Phoenix connector pin 5 +, pin 6 -
Opto-isolated input used to monitor the presence of an external wiring loop; absence of a voltage is reported to the DSP and transmitted to the monitoring computer over the Ethernet. Operates on up to 24 VDC

Looping Secondary Analog Output.
Phoenix connector
pin 1 +, pin 2 -. pin 3 chassis

Fault Relay
Phoenix connector
pin 4 normally open
pin 5 swing blade
pin 6 normally closed)
NO / NC relay contacts used to report a failure to an external monitoring system; used mainly to trigger a failure indication on a hard-wired monitoring device; handles up to 0.5 Amps at 24 V , AC or DC.

Voltage Selector
Not on all Models

IEC Power Connector

AC Line Fuse

AC Power ON/Off
NOT under computer control by RHAON.
RHAON software can put the amplifier in Standby, but a remote computer cannot disconnect the AC power. To toggle between On and Standby manually, hold both the Up & Down Volume push buttons down for approximately 3 seconds.

The RHAON input panel shown above is a PF2-500R. Other input panels include the same connections and controls in different layouts.

NOTE: To prevent inadvertent operation the Mute, Volume Up & Volume Down, and Input Pad push buttons need to be pressed and held down for several seconds before they activate.

Appendix II (continued): RHAON Hardware Inputs, Outputs & Indicators

A PM-3R RHAON module has the same controls and indicators as the PF2-500R module on the previous page, but the layout is different.

Signal LED
Flickers when an audio signal of at least -30 dBu is present at the primary analog audio input.

Input Pad & LED Indicator
On / Off 10 dBa pad for Primary Analog Input; allows input signals of up to +24 dBu when inserted manually or via computer control. Note: this pad does not affect the +12 dBu maximum input level of the Secondary Analog Input.

Secondary Analog Input
Phoenix connector
pin 1 +, pin 2 -, pin 3 chassis
can be configured as a "priority override" input

Overdrive LED
Flashes red when the Primary Analog Input preamplifier is being overdriven (input clipping)

Looping Analog Output
XLR male
pin 1 chassis, pin 2 +, pin 3 -

Looping Secondary Analog Output
Phoenix connector
pin 1 +, pin 2 -. pin 3 chassis

Primary Analog Input
XLR female
pin 1 chassis, pin 2 +, pin 3 -

Fault Relay
Phoenix connector
pin 4 normally open
pin 5 wiper
pin 6 normally closed
NO / NC relay contacts used to report a failure to an external monitoring system; used mainly to trigger a failure indication on a hard-wired monitoring device; handles up to 0.5 Amps at 24 V AC or DC.

Power LED
Glows when the amplifier is On and not in Standby

Serial Digital Audio Input
Phoenix connector
pin 3 chassis, pin 4 +
AES3id format; automatically disables all other inputs when selected

Yellow LEDs flash when the connector is active, glow steadily when data is streaming.
Green LEDs glow when connected but inactive, turn Orange to indicate a faulty connection.

Primary & Secondary Ethernet (CobraNet) Inputs
RJ-45 female
When both inputs are connected, changeover to Secondary is automatic if Primary fails.

Fault Detect
Phoenix connector
pin 5 +, pin 6 -
Opto-isolated input used to monitor the presence of an external wiring loop; absence of a voltage is reported to the DSP and transmitted to the monitoring computer over the Ethernet. Operates on 5 to 24 VDC

Mute Buttons
Note: Muting is also computer controlled.

Protect LED
Lights to indicate that protection limiting is engaged.

Push Button Volume Controls
Also functions as a manual Standby/ON control; see Power ON/Off Switch
Note: output level is also computer controlled.

Thermal LED
Lights to indicate that an over-temperature sensor has shut the amplifier down

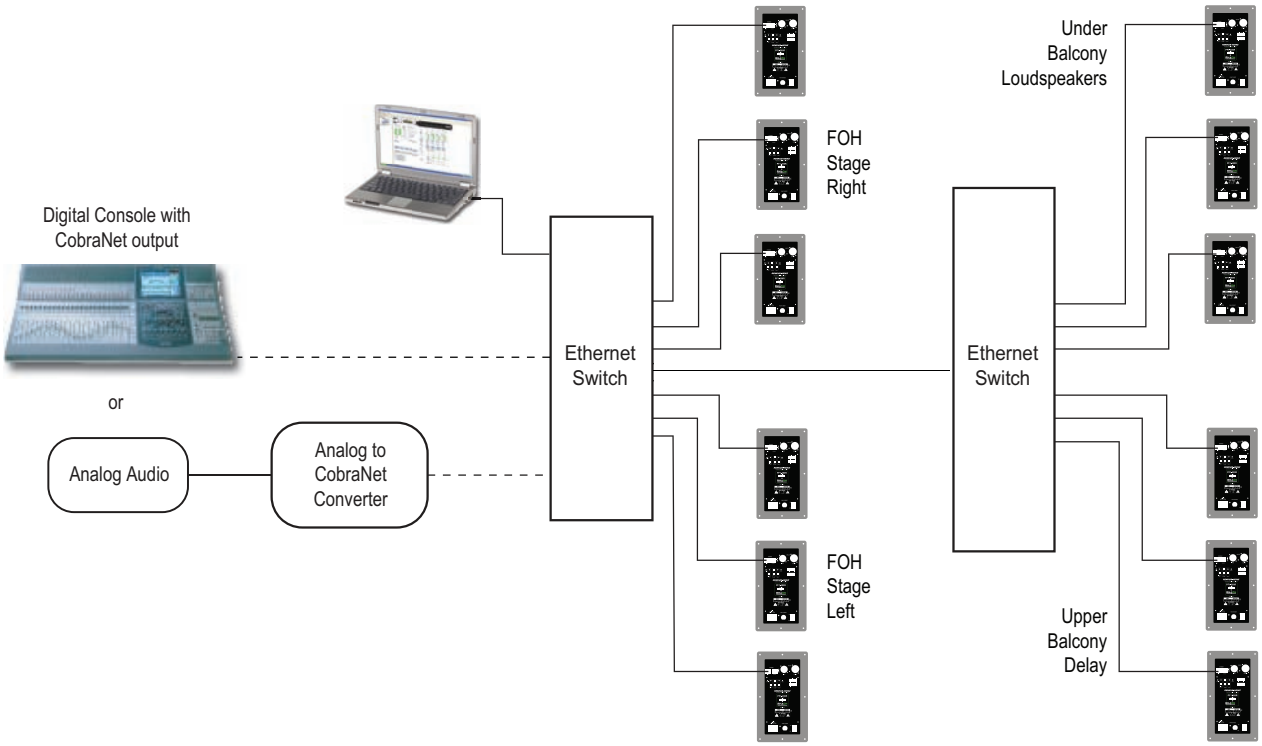
NOTE: To prevent inadvertent operation the Mute, Volume Up & Volume Down, and Input Pad push buttons need to be pressed and held down for several seconds before they activate.

APPENDIX III: RHAON Block Diagrams

CobraNet

The drawing below shows the signal paths for a RHAON system using CobraNet digital audio distribution.

Except for the analog audio input line to the CobraNet Converter, all cable runs are standard UTP cable meeting at least CAT5e standards. The network is a standard Ethernet star topology. CobraNet does not permit looping or “daisy chaining” from amplifier to amplifier. The maximum CAT5e cable length between devices is 100 Meters (approximately 325 feet) using CAT5e cable and 1000 meters with fiber optic cable.



Wiring diagram for a system using CobraNet for multi-channel digital audio distribution, loudspeaker control and monitoring.

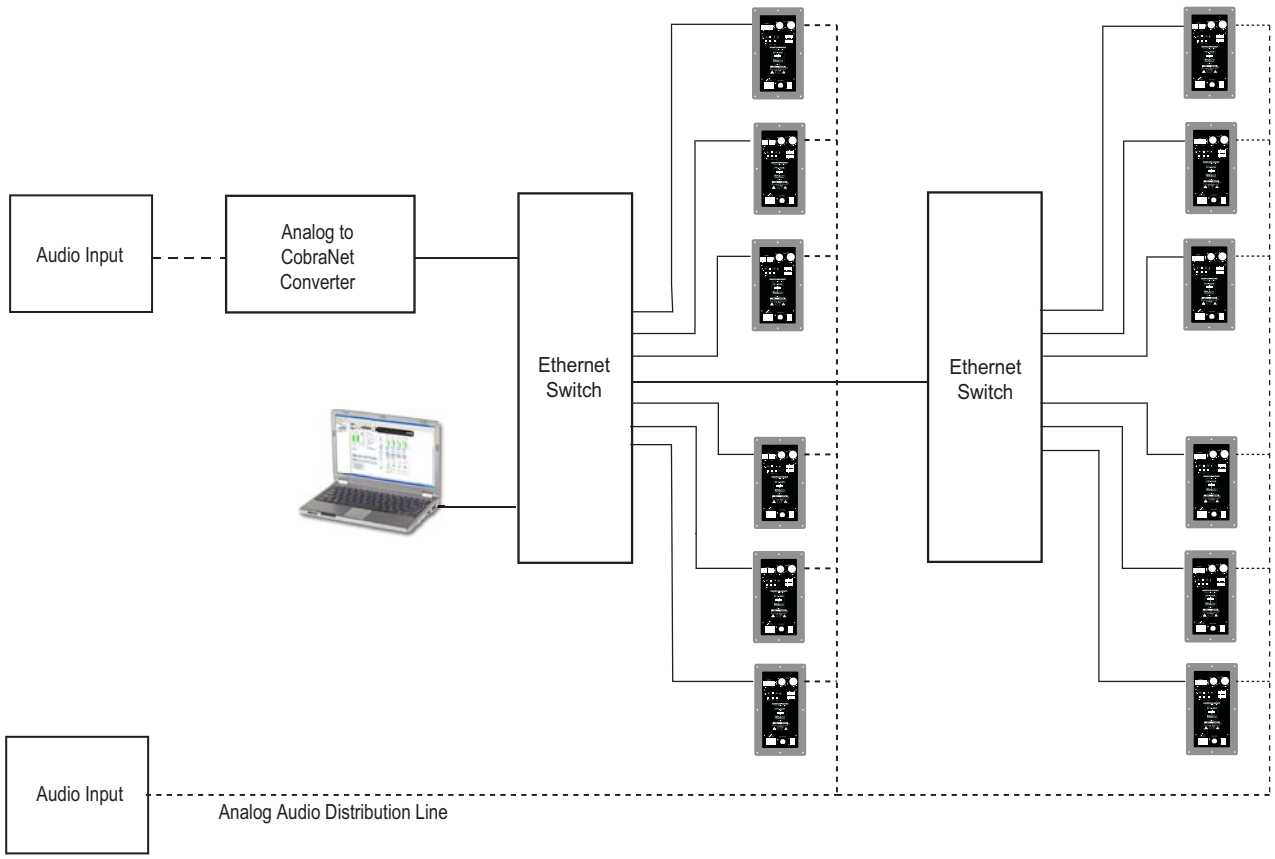
Notes

1. Satisfactory Ethernet switches of many sizes (output ports) are widely available from many sources. Managed switches are recommended over unmanaged switches; 100 BaseT minimum, Gigabit (1000 BaseT) recommended.
2. The number of loudspeakers is determined by the number of output ports provided by the switches. The computer(s) can be connected to any Port on the Ethernet network.
3. Systems with CobraNet digital audio distribution require either a suitable Analog to CobraNet converter or a mixing console with a CobraNet output. Suitable analog to CobraNet converters are available from a number of sources, such as Bi-Amp, Peavey and others.
4. The RHAON network can easily be made redundant by connecting a duplicate of this network to the Secondary Ethernet Inputs on each loudspeaker. Additional switches, analog-to-CobraNet converters, etc. would be required.

APPENDIX II: RHAON Block Diagrams

CobraNet With Analog Backup

The block diagram below shows a combination system combining CobraNet with analog audio distribution and RHAON loudspeaker control and monitoring. Notice that the analog audio wiring loops (is daisy chained) from loudspeaker to loudspeaker.



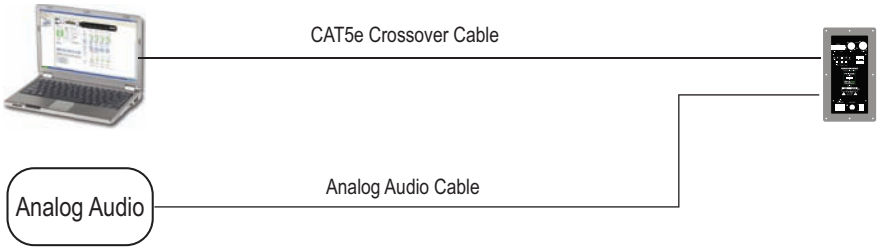
Typical wiring diagram for a system having both analog and CobraNet audio distribution plus loudspeaker control and monitoring.

Notes

1. Combination systems such as the one shown above often use the multi-channel audio distribution capabilities of CobraNet for normal program distribution and the analog audio circuit for other functions. The analog audio circuit need not connect all the loudspeakers together. It could, for example, be broken into several separate analog circuits for zone paging applications, for monitors, fills, etc.
2. The analog to CobraNet converter would not be needed for a system using only analog audio along with RHAON Control and Supervision. The Analog to CobraNet converter is needed only if CobraNet digital audio distribution will be used.
3. The Ethernet network is required for control and supervision even if only analog is being used.

Basic Analog System

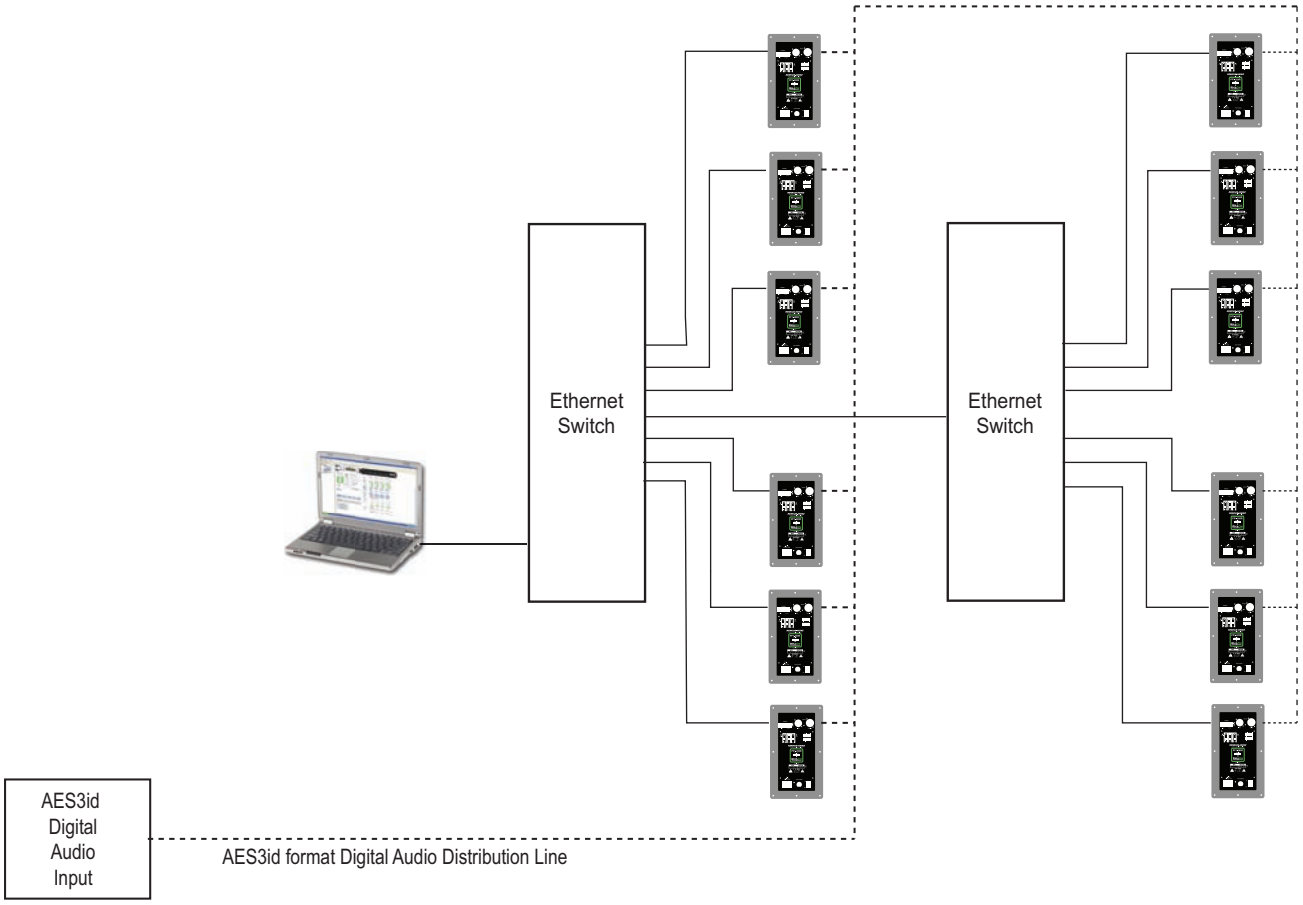
1. Simple single loudspeaker systems using analog audio do not require an Ethernet switch. All that is needed is a CAT5e Crossover Cable.



APPENDIX II: RHAON Block Diagrams

Serial Digital (AES3id)

The block diagram below shows a RHAON system using digital audio distribution in the AES3id format along with RHAON loudspeaker control and monitoring. Notice that the wiring daisy chains from loudspeaker to loudspeaker.



Notes

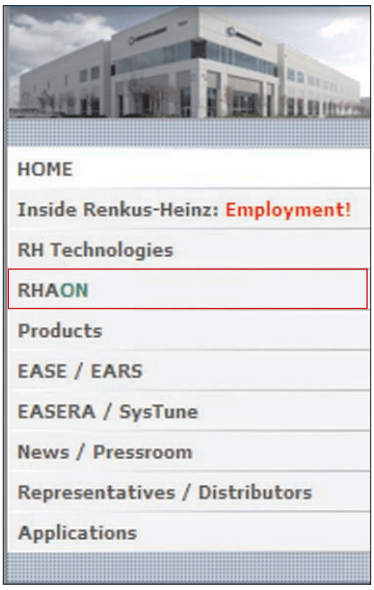
1. In this system, RHAON and the Ethernet network are being used only for loudspeaker control and monitoring.
2. Neither CobraNet digital audio distribution nor analog audio distribution are available when AES3id format digital audio distribution is being used; the AES3id format audio channels occupy the amplifier's analog input channels.
3. The AES3id inputs on RHAON empowered loudspeaker amplifiers are high impedance to allow daisy chain connection. The last unit in the chain should be terminated with a 110 Ohm resistor.

APPENDIX IV: KEEPING YOUR RHAON PROGRAM UP-TO-DATE

Software Updates

As soon as a new program version is created, Renkus-Heinz posts it on the Renkus-Heinz website to make it accessible to all RHAON users. Updates to the RHAON firmware are posted in the same location.

To check out this site, go to **www.renkus-heinz.com** and click on RHAON in the left hand menu. You'll see the link to the latest RHAON program version at the top of the RHAON page; see below.



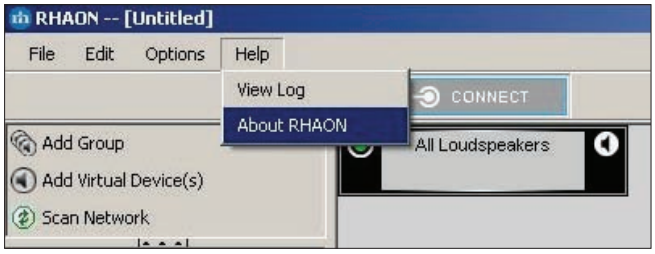
RENKUS-HEINZ
Home RHAON
RHAON (Download Program Software)
Released DSP Firmware files.
• CF Series
• SG Series
• PN Series
• ST Series
• Subwoofers
• Plain Amplifiers
DSP Firmware files contain the "loudspeaker spe
individual Renkus-Heinz loudspeakers: EQ, Cros
protection settings, meter calibration, etc. These
each RHAON loudspeaker's amplifier at the factory.
Since these files may be updated from time to t
overall performance or to add new RHAON feat
occasionally checking these files to make sure yo
versions in your RHAON program and in the lo
Typically these files are installed under C:\P
Heinz\RHAON\DSP_Firmware.
DSP Firmware files are also needed to re
amplifiers, if you want to move an amplifier f
model to another.

You, of course, will need to know what version of RHAON is installed on your computer to determine if a later version is available. If you don't know what version is installed on your computer, there are two easy ways to find out. The first is to simply open RHAON and observe the opening splash screen. The program version number is displayed there as the program is opening.

APPENDIX III: KEEPING YOUR RHAON PROGRAM UP-TO-DATE

Software Updates

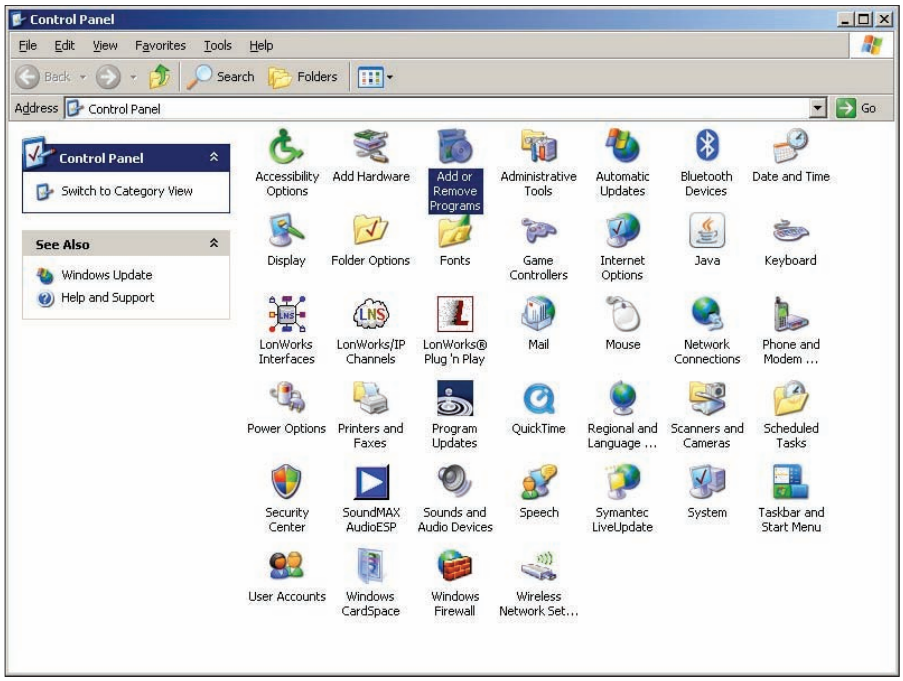
The second method is to open RHAON and select the Help drop down menu and click on About RHAON. This will bring up a dialog box with the current RHAON information.



Replacing Your Current Installation of RHAON

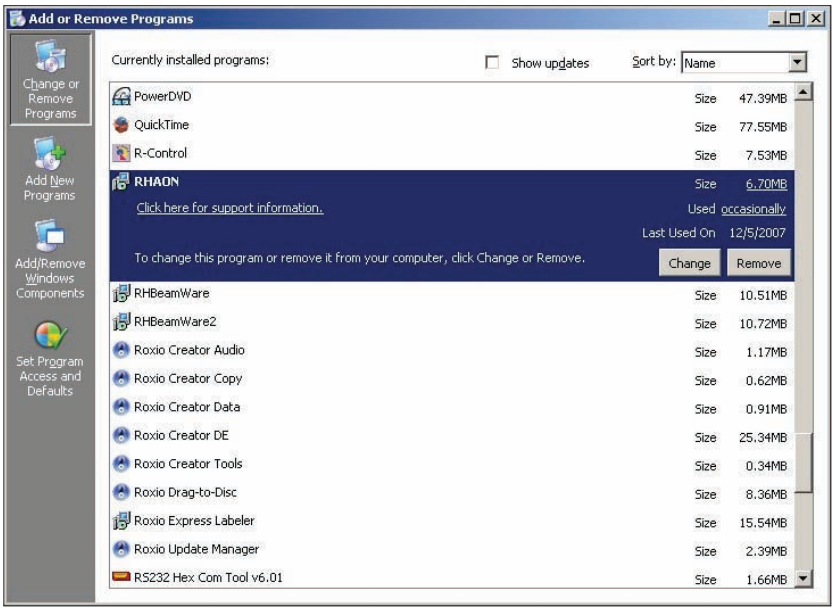
You must uninstall a previous version of RHAON before attempting to install a newer program version.

Step 1: Migrate to the Windows Control Panel and open “Add or Remove Programs”.



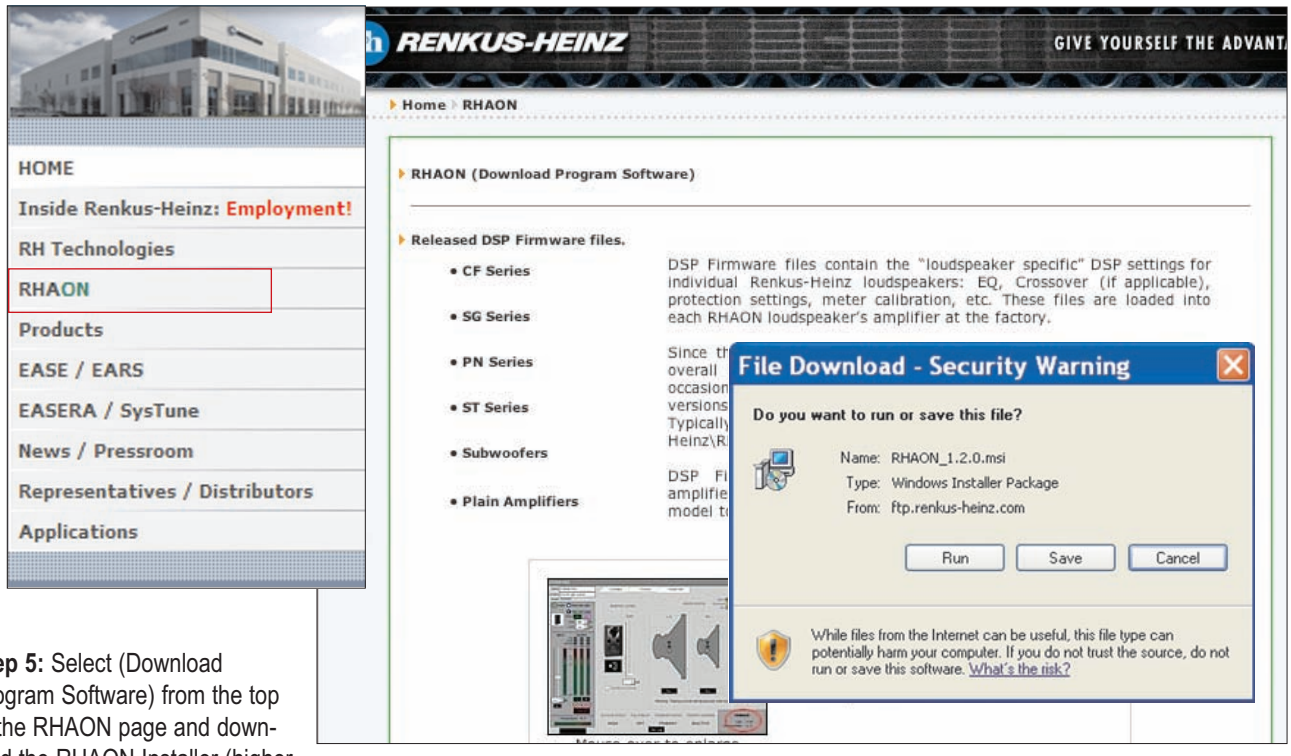
Replacing Your Current Installation of RHAON (Continued)

Step 2: Find RHAON in your list of Installed program and click “Remove”.


Add or Remove Programs
Change or Remove Programs
Add New Programs
Add/Remove Windows Components
Set Program Access and Defaults
Currently installed programs:
Show updates
Sort by: Name
PowerDVD Size 47.39MB
QuickTime Size 77.55MB
R-Control Size 7.53MB
RHAON Size 6.70MB
Click here for support information.
Used occasionally
Last Used On 12/5/2007
To change this program or remove it from your computer, click Change or Remove.
Change
Remove
RHBeamWare Size 10.51MB
RHBeamWare2 Size 10.72MB
Roxio Creator Audio Size 1.17MB
Roxio Creator Copy Size 0.62MB
Roxio Creator Data Size 0.91MB
Roxio Creator DE Size 25.34MB
Roxio Creator Tools Size 0.34MB
Roxio Drag-to-Disc Size 8.36MB
Roxio Express Labeler Size 15.54MB
Roxio Update Manager Size 2.39MB
RS232 Hex Com Tool v6.01 Size 1.66MB

Step 3: Click “Next” for the menus that arise until RHAON is uninstalled.

Step 4: Go to **www.renkus-heinz.com** and click on RHAON in the left hand menu. Refer to graphic below.


HOME
Inside Renkus-Heinz: Employment!
RH Technologies
RHAON
Products
EASE / EARS
EASERA / SysTune
News / Pressroom
Representatives / Distributors
Applications
RENKUS-HEINZ
GIVE YOURSELF THE ADVANT
Home RHAON
RHAON (Download Program Software)
Released DSP Firmware files.
• CF Series
• SG Series
• PN Series
• ST Series
• Subwoofers
• Plain Amplifiers
DSP Firmware files contain the "loudspeaker specific" DSP settings for individual Renkus-Heinz loudspeakers: EQ, Crossover (if applicable), protection settings, meter calibration, etc. These files are loaded into each RHAON loudspeaker's amplifier at the factory.
File Download - Security Warning
Do you want to run or save this file?
Name: RHAON_1.2.0.msi
Type: Windows Installer Package
From: ftp.renkus-heinz.com
Run
Save
Cancel
While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not run or save this software. What's the risk?

Step 5: Select (Download Program Software) from the top of the RHAON page and download the RHAON Installer (higher version numbers indicate newer releases).

Step 6: Follow the instructions in the installer.

Updating Microcontroller Firmware

The latest microcontroller firmware files (.hex files) were installed in your array before it was shipped to you. These files contain the programming that runs the DSP microcontroller in the RHAON Empowered amplifiers, and are updated from time to time as the firmware is improved.

If you are having problems with your system, we may ask you to update the firmware as part of troubleshooting. You'll find the firmware files on the RHAON download page below the Program and Bin File downloads. They need to be placed in the "MicroC_Firmware" sub folder of your RHAON installation (typically "C:/Program Files/Renkus-Heinz/RHAON/MicroC_Firmware").

Step 1: Open RHAON, scan the network and right click on one of the loudspeaker listings in the directory tree view or on the loudspeaker's icon in the main display area to open a pop up menu.

The pop up menu will vary depending on which method you choose.

If you choose the loudspeaker's listing under the Network sub directory, the menu shown in figure 1 will pop up. Note that it also includes commands for turning on the loudspeakers Wink light and for sending pink noise to the loudspeaker to help you identify which loudspeaker you have selected.

Figure 1

The menu in Figure 2 will appear if you opened the menu through listing in the All Loudspeakers section of the directory tree. Notice that it also allows you to set up an interface with SysTune. It allows SysTune users to access the Control Properties folder for the loudspeaker and make final tuning adjustment while observing the results in SysTune.

The Import and Export GFB files allow you to exchange data with the EASE SpeakerLab program.

Figure 2

Accessing the pop up menu by right clicking on the Loudspeaker's icon produces the window shown in Figure 3. It is similar to the previous method, except for not allowing you to Rename the loudspeaker.

Be aware that on amplifiers having firmware versions prior to version 1.28 you will need to make sure the Loudspeaker is in the "Power On' mode. Check the Power LED on the back of the amplifier to see if it is lit or if the center of the Power indicator in the RHAON screen is Green.

If not, either click the Power button in RHAON or use the Volume Up and Volume Down buttons on the amplifier (press and hold down both buttons at the same time for 3 seconds) to turn the power On.

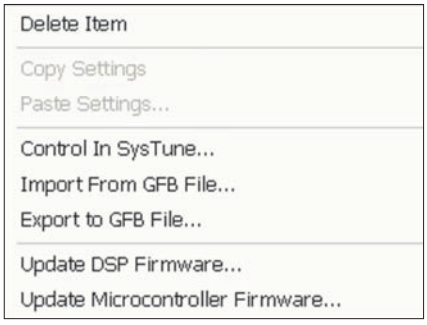
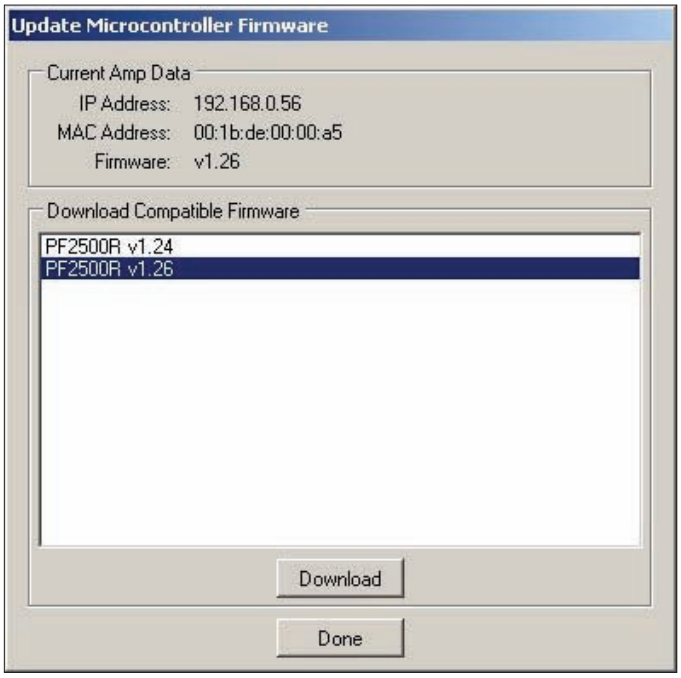


Figure 3

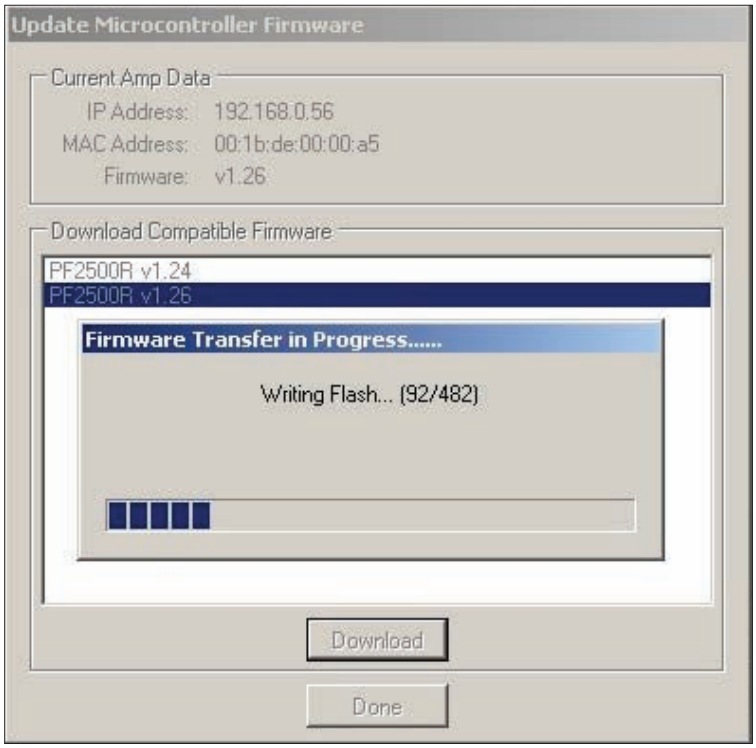
Updating Microcontroller Firmware (Continued)

Step 2: Select Update Microcontroller Firmware and when the window shown below opens select the appropriate firmware file and press Download. Notice that the window tells you what Microcontroller Firmware version is installed in the loudspeaker. Selecting Download will install the new firmware in the loudspeaker.



Step 3: Wait for the Firmware transfer to complete. When finished, control will be returned to the menu. Select “Done”.

Please be aware that the Mutes and the Analog Input Pad will be On after the update completes and may need to be reset.



Updating DSP Firmware

The latest 48 kHz DSP firmware files (.bin files) were installed in your array before it was shipped to you. These files contain the loudspeaker specific EQ, crossover and protection settings for the loudspeaker and are updated from time to time as the firmware is improved.

If you wish to operate your system at 96 kHz, you will need to download and install the 96 kHz .bin files for your loudspeaker(s).

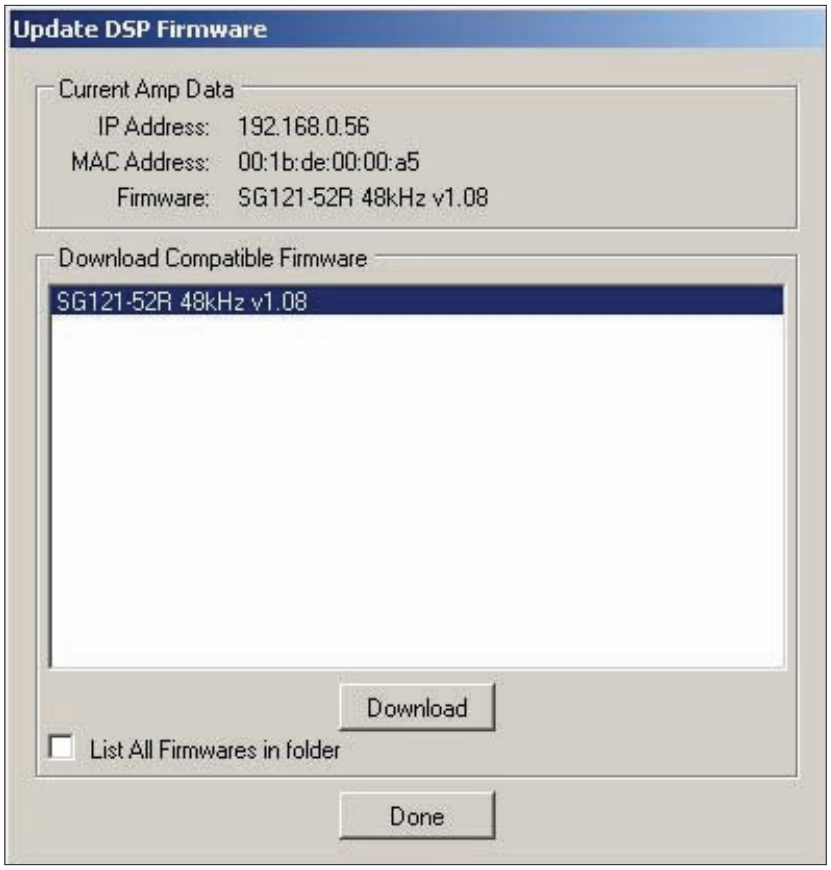
We may ask you to update the .bin files as part of troubleshooting, if you are having problems with your system, Be aware that .bin files names which start with RH4... are 48 kHz files; 96 kHz files start with RH9... You'll find the .bin files on the RHAON download page below the Program download.

These files need to be placed in the "DSP_Firmware" sub folder of your RHAON installation (typically "C:\Program Files\Renkus-Heinz\RHAON\DSP_Firmware").

Step 1: In RHAON, right-click on the one of the loudspeaker listings in the directory tree view or on the loudspeakers icon in the main display area and select "Update DSP Firmware…". The pop up menues are the same ones we explored on page 41 under Updating Microcontroller Firmware.

Selecting Update DSP Firmware will open the window shown below. Notice that the program lets you know what firmware is installed in the loudspeaker.

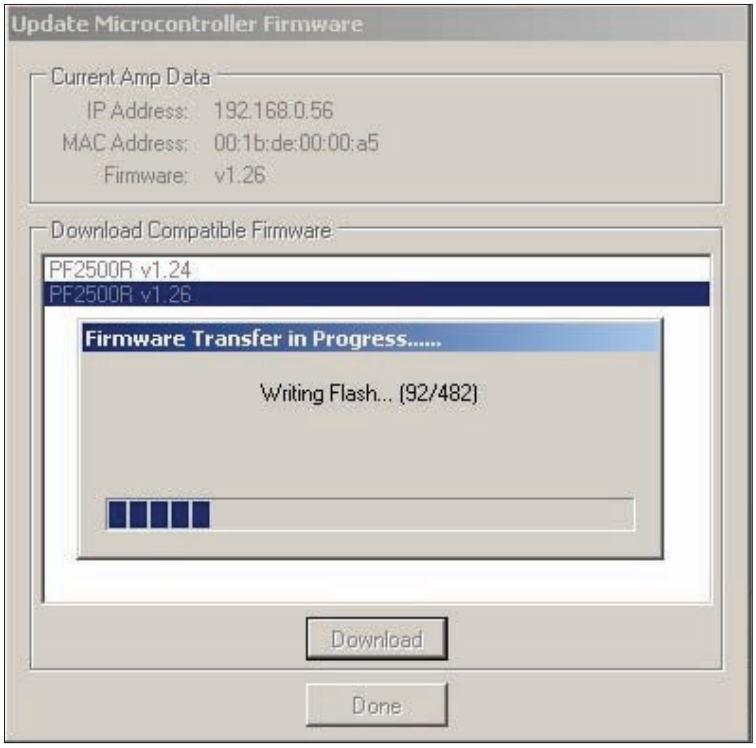
Step 2: Select the appropriate firmware to download and press "Download". If no listings appear in the white field, it's a sign that you have not downloaded any .bin files for that loudspeaker from the web and placed them in the DSP_Firmware folder.



Updating DSP Firmware (Continued)

Step 3: Wait for the Firmware transfer to complete. When finished, control will be returned to the menu. Select “Done”.

Please be aware that the Mutes and the Analog Input Pad will be On after the update completes and may need to be reset.



GENERAL INFORMATION

Your Renkus-Heinz loudspeaker contains no user-serviceable parts and all service should be referred to qualified service personnel.

Hum and Noise Problems

If you encounter hum or noise problems in your system, please refer to the Loudspeaker User’s Manual that came with your loudspeaker, Renkus-Heinz form RH508 Rev B. It includes detailed instructions for locating the source of these problems and solving them.

Networking and RHAON Systems

Lesson 1: Switched Networks

The Ethernet protocol is a frame-based computer networking technology for local area networks (LANs). This means it is a system for sending uniquely addressed packets of information from a source to a destination, similar to how one sends a letter through the postal service. When you mail a letter to Aunt Gertrude across town, the letter doesn't just go straight from your mailbox to your Aunt's. It goes to the post office, where it is sorted and sent along with Gertie's local mailman. The same holds true for networks, only replace "post office" with "network switch".

Switched networks are laid out in a "star" configuration, in that the topology has the switch at the center with links fanning out to all devices and/or other stars. Typical transport media are CAT5e cable (up to 100m) or optical fiber (up to more than 2km). Communication is handled in a "Point-to-Point" fashion, in that each node communicates solely with the next node attached to it. Using our previous example, the letter starts in your mailbox and is picked up by your mailman, who then transports your letter to the post office, where it is sorted and given to Gertrude's mailman, who then drops it off in her mailbox. How do the switches know where to send the packets? By remembering, of course! Just as the letter to Aunt Gertrude includes a "To" and "From" address, so does a packet. The switch remembers which "From" addresses come from which port in order to speed up future traffic.

Two of the main distinguishing characteristics between switches are speed and management. The two main speed standards that comprise the majority of RHAON installations are 100Base-T (Fast Ethernet) and 1000Base-T (Gigabit Ethernet). While RHAON device connections are Fast Ethernet, either speed may be used as higher speed switches are backwards compatible with those of lower speeds. The advantage to using Gigabit switches with a RHAON network is that while the individual connections are 100Base-T, the switching times (the time it takes between packet ingress and egress) are much shorter. This becomes especially important from both a hop and total nodes standpoint as the size of a network grows. We recommend Gigabit switches for large networks.

Aside from speed, switches come in two flavors: Managed and Unmanaged. An unmanaged switch is essentially a "dumb" black box that takes packets in and sends them where they need to go. A managed switch, however, allows you much more control. With a managed switch, one can designate subsets of ports as separate networks, control which types of packets are allowed in or out of certain ports, monitor current network traffic conditions, port status, etc. For a great number of installations, an unmanaged switch will suffice. However, for larger or more complex setups, a managed switch becomes critical, though a decent level of networking expertise is required for proper setup.

Lesson 2: Packet Addressing

On a Local Area Network (LAN), packets are addressed by the Media Access Control (MAC) address of the network device. MAC addresses are "burnt-in" by the manufacturer of your network device (computer network card, RHAON loudspeaker, etc.) and are globally unique. This is like the VIN on your car. No matter where you register your car, the VIN stays the same and is unlike that for any other vehicle worldwide.

Not all communication happens on a LAN, however. In order to address different devices on different networks, Internet Protocol (IP) addresses were introduced. They allow for easier routing for a vast array of interconnected networks. Similar to this is the license plate on a car. Rather than attempting to search for the car by going through the VINs for every car in the world, one could narrow things down by first selecting the country in which it was registered and then by license plate number within that country. RHAON acts as the license plate authority, if a CobraNet device (RHAON speaker, mixer, etc.) doesn't yet have a "license plate", it asks RHAON for one and the software kindly obliges.

Packets addressed by MAC address are known as "Ethernet packets". In addition to information about the source and destination and the payload, there is a marker for what type of Ethernet packet is being sent. IP packets (ones that can be sent within or out of the LAN) have one identifier and CobraNet packets have another. Because CobraNet packets don't contain IP information in their payload, CobraNet is limited to being LAN-only. The structure of an IP packet is very similar, in that it contains - among other information - a source address, a destination address, and protocol type. For RHAON, the protocol types of UDP and TCP are the ones in heavy use. Building upon the UDP protocol is the Simple Network Management Protocol (SNMP), which is what RHAON uses to monitor or manipulate exposed variables (EQ, Bundle Assignments, etc.) on a RHAON loudspeaker or other CobraNet device. At each stage in the process of handling a packet, the previous layer is left behind. Once a payload type is determined, just that payload is handed off to the appropriate handler.

Networking and RHAON Systems

Lesson 2: Packet Addressing (Continued)

To better understand what takes place when RHAON tells a loudspeaker “Set Gain to -10dBa”, think of Russian nested dolls. Your computer will send out the whole doll, which contains an IP doll, which contains a UDP doll, which contains an SNMP doll, which contains the message “Set Gain to -10dBa”. When a device sends out a piece of CobraNet audio, it sends out a whole doll, which contains a CobraNet doll, which contains the piece of audio.

With CobraNet, since both devices have a ‘burnt-in’ MAC address, communication can happen right away. For SNMP communication between the computer and RHAON loudspeaker to happen, both devices must have a valid IP address. In most home or office networks, there is a device called a ‘router’ that not only contains a network switch, but can also handle the assignment of IP addresses within its network through a protocol called DHCP. CobraNet (and, by extension, RHAON) uses a different protocol for requesting / assigning IP addresses, but the end result is still the same. Your router has a static IP address assigned to it, devices ask it for an IP, and the router obliges. For this same reason you must assign a static IP address to your computer.

FAQ and RHAON Network Troubleshooting Tips

RHAON relies on standard networking communication and CobraNet, so general networking and CobraNet troubleshooting documents can be consulted in addition to this guide. Keep all documentation related to your network switches handy.

Before getting into in-depth troubleshooting, verify the correctness of all wiring and the network topology.

- Verify that no network cables are defective and that they are all properly inserted into their connectors.

Hint: The orange LED associated with the Primary Ethernet connector will be flashing orange when it senses a connection to an Ethernet device. If both orange LEDs flash on a loudspeaker, it means there is no signal on the Primary input and the DSP is connected to the Secondary input.

The green LEDs flash to indicate a connection, glow when data is flowing.

Connectivity Issues

Problem: I click “Scan Network” and no devices show up.
Solution:
- Verify you have selected the correct network adapter in the RHAON preferences.
- Verify the IP address for that network adapter is static.
- Verify the IP range you have selected for RHAON to hand out is in the same subnet as the IP address of your net work adapter (i.e. that the first 3 [of 4] numbers of the addresses are the same).
- Verify the Windows Firewall for the selected network adapter is turned OFF.
- Open CobraNet Discovery -- using the same settings you use in RHAON -- to see if your loudspeaker shows up. CobraNet Discovery is a Cirrus Logic software tool that identifies and displays all CobraNet devices on a network. It is helpful in diagnosing and correcting any misconfigured equipment. CobraNet Discovery was included on your RHAON CD and can be easily installed from it. It can also be downloaded free of charge from:
  ftp://ftp.renkus-heinz.com/Software/CNDisco342.exe
  or
  http://www.cirrus.com/dispatch/forms/sup/boardreg/breg/agree.jsp?agid=TB237&fp=/en/pubs/software/CNDisco345.exe

Problem: I am attempting to do anything RHAON-related over a Wireless Access Point, or I am attempting to either control a RHAON network or pass audio over a WiFi link with no results
Solution: Because of CobraNet bandwidth and latency concerns, RHAON (and CobraNet) will not work effectively over an 802.11a/b/g/n WiFi link.

FAQ and RHAON Network Troubleshooting Tips (Continued)

Problem: My computer went to sleep with RHAON running and now I cannot communicate with my loudspeakers or see any of them on the network.
Solution: The CobraNet Components may not be able to recover from sleep mode on some computers. This issue may be resolved in future CobraNet updates. To fix, close RHAON (and, if running, CobraNet Discovery) and bring up the Windows Task Manager (Ctrl-Alt-Delete). Under the tab "Processes", look for 'PACNDISCO.EXE' and 'PASSBRIDGE.EXE' (Windows may shorten the name and add '~1'). Select them and click "End Process". Proceed to re-open RHAON and/or CobraNet Discovery.

Switch-Related Issues

Note that unmanaged switches have no configuration. If you believe an error is related to your unmanaged switch, consult your switch's documentation.

Problem: I placed my RHAON devices on the same network as other devices (venue PCs, lighting, etc.) and now either RHAON or the other devices are acting abnormally.
Solution: It is recommended that your RHAON network is placed on a network separate to that of anything else. If it is absolutely necessary to have them running through the same switch, it is recommended to use a managed switch and set up separate Virtual Local Area Networks (VLANs), grouping the ports you wish to use for RHAON in one VLAN and the ports for other devices in another.

Problem: I have set up my VLANs but now I cannot connect to / scan for the RHAON loudspeakers on my network.
Solution:
- Verify the physical ports that both your RHAON loudspeakers and your computer are connected to are all on the same VLAN.
- Verify that SNMP traffic (UDP ports 161 and 162) and CobraNet traffic (Ethernet protocol identifier 0x8819) are allowed on your VLAN. Consult your switch documentation for how to configure VLANs.

Problem: I have to wait 10-20s in order for my device to be "connected" and the flurry of traffic to begin when connecting my loudspeaker to the switch.
Solution: Your switch may have Spanning Tree Protocol (STP) turned on. STP prevents accidental looping in your network topology, but unfortunately needs to run an analysis on any new connection before it is deemed OK to be "on". If you do not desire the delay and don't need any services STP provides, turn off STP on your switch. Consult your switch documentation for instructions.

Notification Email Related Issues

Be aware that for Email notifications or using Remote Desktop-type software to control the RHAON computer, a second network interface connected to a separate network is required.

You will need to contact the network administrator at the installation for details on connecting to their Simple Mail Transport Protocol (SMTP) server, also known simply as 'the outgoing email server'.

Problem: I am receiving errors attempting to send emails with an Error Message of "The specified string is not in the form required for an e-mail address."
Solution: Be aware that what you enter in the "Name of Installation:" field is used as part of a spoofed "From:" field in the notification email. Use of non-US-ASCII characters in an email address is invalid. For example, use of Greek letters, symbols not on a US keyboard, or the '@' symbol are not allowed. For more information, please visit: http://en.wikipedia.org/wiki/e-mail_address.

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RENKUS-HEINZ

19201 Cook Street, Foothill Ranch, CA USA
Phone: +1 949 588 9997 • Fax: +1 949 588 9514 • sales@renkus-heinz.com
www.renkus-heinz.com

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